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THE DIAGNOSIS OF VIRUS DISEASES*

THOMAS FRANCIS, JR., M.D.

Professor of Bacteriology and Director of Laboratories,
New York University College of Medicine
New York City

TO A GREAT extent the difficulty surrounding the diagnosis of virus diseases lies in the fact that the clinical pictures represented by them have not been clearly defined. In many instances the dissection of clinical syndromes into etiological entities has just begun. This is particularly emphasized in the case of the bacteriologically sterile infections of the central nervous system and the group of respiratory infections which include the common cold, grippe and influenza. The situation has many parallels in the field of bacterial diseases. Consider the development of knowledge concerning intestinal infections in the latter part of the 19th century or, more recently, the gradual clarification of the diagnosis of pneumonia by correlation of clinical pictures with demonstrable etiological agents.

We think of the diagnosis of virus diseases as something solely dependent upon the laboratory, requiring intensive training and highly specialized technics. But in some of the best known of the virus diseases the diagnosis is almost entirely based upon clinical criteria. Smallpox, measles and chickenpox are obvious examples and are so because their recognition is aided by eruptions which are readily seen and can be visibly distinguished. Nevertheless, the majority of virus infections still remain within the realm in which the clinical criteria for early diagnosis are as yet inadequate. And since the principle of differentiating diseases upon an etiological basis is so completely established in the field of acute infections, there is dissatisfaction with any

classification which identifies them merely as symptom-complexes.

The procedures for the diagnosis of bacterial diseases have developed gradually and with their development the clinical pictures have taken form. The same will undoubtedly hold in virus diseases. In virus studies a different set of clubs is used. While much time is spent in the rough and in traps before reaching the green, there are, however, certain guides which make the trees and long grass less unfriendly and certain tell-tale marks which enable one to keep his eye on his own invisible ball.

Methods of Isolation and Preliminary Identification

The methods used in the diagnosis of virus diseases are based upon certain attributes of the viruses themselves, and the application of these principles to the isolation and identification of a particular virus represents merely specific variations in the general procedures.

In the identification of bacteria great attention is given to the type of culture media in which an organism grows best, to its growth characteristics, its morphology and staining qualities, and to serological reactions which tend to identify it. A similar set of procedures is followed in studies of viruses with the exception that to a great extent the test tube is replaced by a living animal, tissue extracts are replaced by living cells and the simple smear is replaced by microscopic sections. Thus, we chart the species of animals which the virus is able to infect and the symptoms which it produces in each susceptible species. In most instances there is a sharp

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selectivity. Moreover, a virus tends to display a distinct affinity for certain organs, rendering it important that the various routes of injection be tried before concluding that a given animal is not susceptible. On the basis of these affinities a rough classification has been made: those which affect the skin, such as variola, vaccinia, herpes, varicella, are spoken of as dermatotropic; those which primarily attack the nervous system, such as rabies, poliomyelitis and the encephalitides, are called neurotropic; those with greatest predilection for the respiratory tract, influenza, common cold, psittacosis, distemper, are termed pneumotropic; still others in which the abdominal viscera bear the brunt of the damage as with the liver in yellow fever and Rift Valley fever may be called viscerotrophic. There are also the viruses which give rise to tumor formation. In many of these instances there is a generalized infection in addition to the tendency to localize in a single organ where the major damage occurs. Furthermore, the characteristics may vary from species to species and may be influenced by the route through which the virus is introduced.

In addition to the selectivity of viruses for species of animals and for certain organs in the animal body, specific viruses may exert a characteristic effect upon specific cells within that organ; thus, poliomyelitis classically destroys the anterior motor neurones; louping ill, the Purkinje cells of the cerebellum; influenza, the respiratory mucous membrane; yellow fever, the liver cells.

The viruses are further identified by the type of cellular reaction they elicit in a given location—necrotic, proliferative, hyperplastic, or exudative.

These selective affinities of viruses for specific animals, organs and cells represent the selective media and the fermentative reactions of the bacterial world, which enable one to place a recently isolated strain in one group and exclude it from another.

Apart from the changes enumerated, some virus infections are characterized by the presence, in infected cells, of bodies which are distinctively stained. In some cases they are present in the nucleus; in others, they are situated in the cytoplasm of the cell. These structures, known as inclusion bodies, are usually acidophilic

and their distribution in the cells of an infected animal is almost as valuable evidence in the identification of an invading virus as fingerprints in the case of the midnight marauder. An outstanding illustration of the significance of inclusion bodies in diagnosis occurs in rabies, where the demonstration of Negri bodies practically constitutes the diagnostic test. In psittacosis studies, the demonstration of L.C.L. bodies in the spleens of infected mice is also used as diagnostic evidence of the nature of the disease.

On the basis of the studies of Goodpasture,¹⁹ Rivers,²⁰ and others the inclusion bodies appear actually, in vaccinia and fowlpox at least, to represent accumulations of virus particles which may be obtained in pure suspensions. These smaller particles have been called elementary bodies. They are within the range of microscopic visibility, and may be agglutinated by specific sera. They have been subjected to chemical analysis, revealing a complex structure. Finally, there is evidence that a single particle will produce infection.

In addition to the pathological evidence, some indication of the classification of a virus may be obtained by determination of the size of infectious agent. The development of graded collodion membranes^{5,9} has yielded a method by which the relative sizes of different viruses can be ascertained. Under these conditions it has been shown that viruses range in size from those of foot and mouth disease and yellow fever, which approach the dimensions of a protein molecule (10 to 17 mu), to those of vaccinia and psittacosis, which are 175 to 250 mu in diameter and are visible. Others occupy intermediate positions. Knowledge of the size of an unidentified virus obviously serves, therefore, to indicate which known viruses of similar sizes and pathogenicities one must consider.

The foregoing methods are those employed in the isolation of a virus but they also yield valuable preliminary information as to the group of viruses to which the unknown agent may belong and suggest the more likely ones from which it should first be differentiated or with which attempts should be made to identify it.

The final step in identification of a virus consists in testing the resistance of animals known to be immune to certain viruses of similar characteristics with the newly isolated agent or,

conversely, testing animals immune to the unidentified virus with strains of known viruses. Since, however, there are obvious difficulties in carrying out these tests unless all materials are readily available, an indirect approach is more commonly employed. Sera of animals known to be immune to various viruses are tested for their capacity to protect against the virus in question—thus demonstrating the presence or absence of specific neutralizing antibodies. In either case the presence of cross immunity is taken to indicate the nature of the virus. If, then, the serum of the patient from whom the original material was obtained is found to possess, in convalescence, antibodies which were absent at the onset of illness, it is considered a reasonable inference that the disease was actually related to the virus isolated.

Studies of Respiratory Disease

The problem of epidemic influenza has been studied from many points of view with results which have never been fully accredited or reproducible in the hands of different workers. The entire field of upper respiratory infection was reopened with increasing knowledge of virus infections. Psittacosis, formerly thought to be due to Nocard's bacillus, was shown by the work of Bedson,⁶ Krumwiede,²¹ and Rivers and Berry³¹ to be caused by a filterable virus transmitted from parrots to humans. The virus could be adapted to mice and monkeys and in the latter animal produced a pneumonic infection similar to that of the disease in man. The clinical picture so established served as basis for the recognition of the character of pneumonia due to virus infection.

The studies of Shope³⁵ with swine influenza resulted in the demonstration that this epidemic disease of hogs, which bears many comparisons with epidemic influenza of man, was caused by a filterable virus in symbiosis with a bacterium of the *H. influenzae* variety. In this disease, the virus constitutes the important agent in dissemination and immunity while the *H. influenzae suis* contributes the factor which makes the experimental disease comparable in severity to that seen in nature.

Dochez,⁷ Long²³ and their associates were able to show that bacteria-free filtrates of washings from patients with typical common colds were

capable of inducing common colds in the higher apes and in normal subjects. While the infection could not be transmitted to smaller laboratory animals, the evidence seems clearly to relate the common cold, etiologically, to a filterable virus.

In this state of development it was inevitable that attempts be made to restudy that confused complex of epidemic respiratory diseases vaguely termed colds, grippé and influenza. An opening was finally made when Smith, Andrewes and Laidlaw³⁶ reported, in 1933, that they had infected ferrets with a virus present in bacteria-free filtrates from throat washings of patients with influenza. The following year we confirmed this observation with material from epidemics in Puerto Rico, the United States and Alaska^{13,14}. Since that time the virus has been repeatedly isolated in all parts of the world, always from cases associated with an epidemic of influenza. Instead of a simple febrile infection, involving only the nasal passages in ferrets, we found that with serial passages the virus developed the capacity to produce an extensive, sometimes fatal, pneumonia. Both in our laboratory and in England¹ it was found that mice were also susceptible and in this species of animal as well the virus had a primary predilection for the pulmonary tissues resulting in an experimental pulmonary disease of high fatality. Many other species of animals have been tested and, except for possibly the rat and hedgehog, found not to be susceptible; nor is there evidence to suggest that bacteria play any rôle whatever. Striking evidence of the specificity of the virus for the pulmonary tract is shown by the fact that it produces typical infection only by the intranasal route. When given by other routes the animals become immune without experiencing disease. When infected animals recover, they are immune to reinfection, and in their sera antibodies capable of neutralizing the virus and protecting normal animals are demonstrable.

But what evidence is there that the virus so isolated bears any relation to the human disease and that it is not merely a spontaneous infection of ferrets? First of all we have succeeded in infecting mice directly with the throat washings of patients without intermediate passage of the virus through ferrets.¹⁵ It has also been possible to introduce the virus directly into tissue culture medium and onto the chorio-allantoic membrane

of the egg without any previous animal passage.¹⁰ These observations tend to eliminate the factor of animal contamination. In addition, we are able to demonstrate that a high titer of antibodies develops in the serum of patients convalescent from the epidemic disease^{17,18}—in contrast to the results obtained with serum of the same patients taken in the acute stage. These antibodies can be demonstrated by means of the neutralization test in mice and by the much simpler procedure of complement-fixation. The close correlation of these serological reactions with illness from which influenza virus can be recovered has served to establish them as valuable criteria which can be used for diagnosis of epidemic influenza without the necessity at the same time of demonstrating virus in each individual case.

The virus has been found to infect human subjects both by laboratory accident^{19,20} and by the intentional experiments of Smorodintseff and his Russian associates.²¹ Finally, by subcutaneous inoculation of the virus grown in tissue culture medium, it is possible to induce the production of specific antibodies in human subjects without eliciting evidence of infection.²² The rise in antibodies is similar to that which occurs in patients who have actually gone through infection with epidemic influenza.

The evidence seems conclusively, therefore, to identify a filterable virus as the etiological agent of epidemic influenza. Further support for the specificity of the agent is shown by the fact that hemolytic streptococcus tonsillitis, lobar pneumonia, low grade infections occurring at the same time as an influenza epidemic do not yield similar results.¹⁸ This is also true of the afebrile common cold with its typical running nose. In addition, other epidemics of somewhat similar characteristics have been shown by these same procedures not to be epidemic influenza but etiologically different diseases.¹⁴

The studies have thus resulted in the recognition of a disease entity, epidemic influenza, caused by a specific filterable virus. They have established diagnostic methods which will serve for the clinical definition of the disease and have also established a basis of reference for differentiation of other diseases in this maze of respiratory infections.

Encephalitis and Meningitis

Another important group of diseases which has been more clearly elucidated as a result of recent virus studies is that comprising epidemic encephalitis and the so-called sterile or benign meningitis. While it is generally considered to be of virus origin, no convincing demonstration of virus has yet been adduced to prove that encephalitis lethargica—Von Economo—is caused by a filterable virus. Since there have been no significant outbreaks of this disease in recent years, further efforts along that line have not been possible. There have been, however, definite epidemics of acute meningo-encephalitis and instances of other acute nervous diseases which have been subjected to investigation with the result that the etiology has been clearly shown and definite features of diagnostic clinical value have consequently been recognized.

The first of these was an outbreak of acute encephalitis in St. Louis and its environs in the late summer of 1933.^{22,23,28,29} Something over 1,000 cases occurred in a population of approximately one million with a mortality rate of 20 per cent. It was of interest that 89 per cent of the fatalities occurred in patients over the age of forty, although this age group constituted only a little more than half the cases. The onset was sudden in 57 per cent of cases and in 42 per cent there was a prodromal period of aching and malaise for a few days. With the onset of fever, the character of the disease was much the same in both instances. There appeared rapidly headache, high fever, vomiting, somnolence and stupor usually without true coma. Mental confusion was common, tremors of the tongue and lips frequent and nuchal rigidity occurred in 86 per cent of cases. In some instances irritative phenomena appeared instead of somnolence. Ocular symptoms were rare. Difficulties of speech or aphasia were present in about 12 per cent. Superficial and deep reflexes were diminished or absent but a positive Babinski was present in 40 per cent.

The spinal fluid was sometimes normal at onset but shortly developed a pleocytosis of 100 to 300 cells, predominantly mononuclear. In one case 1,100 cells were found. Sugar was not reduced and there was a slight increase in the protein content.

The course was stormy but short, lasting only three to five days in many instances. Recovery was prompt after the defervescence of the fever. Residual symptoms of significant degree were found in a small minority of the cases which were followed.

In fatal cases, an edematous, hemorrhagic pneumonia and degenerative renal changes together with inclusion bodies were so common that only 11 per cent of the fatalities were considered due to uncomplicated encephalitis. In the central nervous system, an intense congestion of the meninges and brain was seen with numerous petechial hemorrhages. There was perivascular round cell infiltration most marked in the pons and basal ganglia and, in addition, scattered foci of cells throughout the brain substance. Degeneration of nerve cells was widespread with most severe damage observed in the nerve cells of the midbrain and basal ganglia. The nuclei of the cranial nerves were not involved.

Suspensions of brain from fatal cases were inoculated into *M. rhesus* monkeys and induced, after an incubation period of eight to fourteen days, a mild, non-fatal infection with fever, muscular weakness, tremor, occasional paralysis, and excitement.²⁹ There was an increase in the number of cells in the spinal fluid to from 150 to 350. The pathology in sacrificed animals was similar to that seen in human cases. Attempts to transmit the disease with patient's blood, spinal fluid or nasal washings were unsuccessful.

It was then found that mice were also susceptible when inoculated by the intracerebral or intranasal routes.⁴¹ After a quiet period of three to four days, these animals develop hyperesthesia, tremors, convulsions and prostration and die in five to nine days. Their brains reveal changes not unlike those of patients but with special damage to the pyramidal cells of Ammon's horn. Rabbits, guinea pigs and young sheep were not susceptible.

Finally, it was demonstrated that the sera of convalescent patients possessed antibodies capable of protecting mice against the virus while normal sera did not. This evidence was conclusive in establishing the relationship of the newly isolated virus to the epidemic of St. Louis encephalitis.

Since the studies with St. Louis encephalitis,

another type of encephalitis occurring in Japan which presents similar epidemiological and clinical features has been shown to be caused by a filterable virus. This, the Japanese Type B encephalitis, was epidemic in Japan in 1924 and 1929. At the time of the St. Louis epidemic the similarities between it and the Japanese Type B—or summer encephalitis—were emphasized. The latter occurs at the same time of year, has the same general symptomatology which differs from that of encephalitis lethargica; is, in general, more highly fatal but retains the tendency to strike harder in the older age groups. While in their clinical and epidemiological features a great resemblance occurs, the viruses of the two diseases have been found to be different serologically in that serum of patients or animals recovered from infection with the St. Louis encephalitis strain does not protect animals from infection with the other, and vice versa.⁴² Moreover, the Japanese strains induce a fatal infection in monkeys and in young sheep. In these characteristics and in its pathology the disease more nearly resembles louping ill.

Equine Encephalomyelitis

In the past year interest has been focused upon another epidemic of encephalitis which possesses characteristics similar to those of the preceding types. Late in August and September of last year southeastern Massachusetts was experiencing a rather high incidence of encephalitis in horses. At the same time cases of human encephalitis occurred in the same area. Forty-six cases of the disease were observed clinically, among which thirty-three deaths occurred. Interestingly, thirty-two of the cases and twenty-one deaths occurred in children under ten years of age. In fact, half the cases occurred in children under five years of age. From the brain tissue of fatal cases a virus was isolated by mouse inoculation.^{12,43}

The virus was found to produce a fatal non-bacterial infection in rabbits, guinea pigs, young sheep and *M. rhesus* monkeys,⁴³ in the latter species virus was present in the blood and spinal fluid. The virus was identified as the eastern type of equine encephalomyelitis by means of neutralization tests with known immune serum. Its identity was further confirmed by direct inoculation of horses which were known to be

immune or susceptible to the eastern type of virus.³³ That this virus was the actual cause of the human epidemic was established by the demonstration that the serum of recovered patients possessed the capacity to neutralize the virus, a capacity not present in serum taken from the same patients early in the disease.⁴³

While the number of cases was small, rather accurate clinical descriptions are available.^{10,44} It must be borne in mind, however, that they probably represent the most easily detected cases and that further studies will modify the impressions gained. The onset of the disease in infants, comprising the majority of observed cases, was sudden, with high fever, irritability or stupor, cyanosis and convulsions. In older children and adults the onset was gradual over four to ten days. Rigidity of the neck and continued muscular tremors and twitchings were uniformly present. All patients became comatose or semicomatose and were not easily aroused. Abnormal ocular findings except for nystagmus were uncommon. Paralysis and muscle spasms were common. Deep and superficial reflexes were usually absent, while Kernig and Babinski were variable. Cyanosis is said to have been marked in all cases. In infants a peculiar edema developed about the eyes. There was ordinarily a high leukocytosis, preponderantly polymorphonuclear. The spinal fluid was under increased pressure, with a marked outpouring of cells (ranging from 200 to 2,000) of which 60 to 90 per cent were polynuclear, at least in the acute stage of disease. Protein was high. Sugar content was normal. If patients survived, the number of cells decreased and more mononuclears appeared. Following the acute stage improvement was slow, with coma and muscular rigidity lasting for days and it appears likely that permanent residuals will be seen.

In fatal cases, deep coma from which the patient never aroused developed and death occurred in four to five days. Pathologically, marked edema and hyperemia of brain stem and upper cord were observed, most marked about the base. Perivascular cuffing with polymorphonuclear and large mononuclear cells was widely distributed and meningeal infiltration with the same types of cells was present. Numerous foci of nerve cell destruction and parenchymatous cellular infiltration were present. The pons,

medulla and basal ganglia were most severely affected and at times the nuclei of cranial nerves and Purkinje cells of the cerebellum were damaged.

We have here, then, a minor epidemic which in seasonal occurrence conforms to that of the St. Louis epidemic and in symptomatology differs primarily in the severity of the disease as measured by the course of disease, the mortality rate and the more intense pathological changes. These changes do not, however, exceed those reported in the Japanese B encephalitis. One sharp difference appears: the Massachusetts outbreak occurred primarily in infants and young children, whereas the others were most serious in the older age groups. But for the virus studies it seems certain that classification of the Massachusetts disease would have been difficult. Knowing the etiology, however, certain differences may be more clearly evaluated.

That encephalomyelitis of horses should also occur as a serious human disease did not come as a total surprise. Meyer²⁶ in 1932 suggested the possibility in three human cases of encephalitis closely associated with sick horses. In 1937, Eklund and Blumstein,⁸ on epidemiological grounds, suspected its occurrence in human individuals and the suspicions were confirmed by serological tests. The virus has been shown to be transmissible by several species of ubiquitous mosquitoes, to occur spontaneously in pigeons¹¹ and pheasants⁴⁰ synchronously with an equine and human epidemic. The application of the technics above outlined for the diagnosis of virus diseases has sharply differentiated by the methods of isolation and identification a new entity in the realm of human diseases.

I should like to mention cursorily one other disease brought to light in the period of time which includes all these other studies—lymphocytic choriomeningitis. The name is probably a misnomer. The virus was first recovered from a monkey inoculated with human brain material during studies of the St. Louis epidemic conducted by Armstrong and Lillie in 1934.² It was then described by Traub in 1935³⁹ as occurring spontaneously in mice, where it maintained itself throughout a colony in a state of perfect parasitism with its host. Finally, Rivers and Scott^{32,34} isolated the virus from human individuals who suffered from a non-bacterial

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TABLE I. DIFFERENTIAL FEATURES OF ACUTE NERVOUS INFECTIONS

	St. Louis Encephalitis	Equine Encephalomyelitis	Lymphocytic Choriomeningitis
Season	Late Summer	Late Summer	Not Seasonal
Age Preference	Over 40 years	Under 10 years	More in adults
Mortality	20%	60% (?)	Low
Major Signs	Meningo-encephalitic	Meningo-encephalitic	Meningeal
Mental State	Somnolence	Coma	Irritation
Stiff Neck	Uniform	Uniform	Common
Tremors	About mouth	Diffuse	Mild, if any
Paralyses	Infrequent	Common	Rare
Reflexes	Absent	Absent	Exaggerated
Eye Signs	Rare	Rare	Rare
Spinal Fluid Cells	100-300 monos	200-2000 polys	Avg. 500+, monos
Course	Short—prompt recovery	Short—delayed recovery	Longer—slow recovery
Complications	Pneumonia, nephritis	Few	Sensory disturbances
Residua	Mild	Probably severe	Mild and infrequent
Pathology	Brain, esp. basal ganglia hyperemia infiltration—mono nerve cell degeneration Inclusions in kidney	Same but more marked also meningitis hyperemia and edema infiltration—poly nerve cell degeneration	Meningitis-choroiditis—mono Inclusions in choroid (?)
Virus Present in	Brain	Brain, sp. fluid	Spinal fluid, blood—probably brain
Size of Virus	20-40 mu	20-40 mu	30-50 mu
Disease in Mice	Inc. 4-5 days Death 5-9 days	Inc. 1-2 days Death 2-4 days	Inc. 5-6 days Death 6-7 days
Disease in M. rhesus	Very mild—i.c.	Fatal—i.c.	Fatal—by all routes
Spontaneous Disease in Other Species	Not known	Horse Pigeon Pheasant	Mice Monkeys

lymphocytic meningitis and a total of some twenty-five cases⁴ has been reported. The disease has not been observed in epidemic form but that it is widespread is shown by the fact that antibodies against the virus are found in the serum of 11 per cent of the general population.⁵ It is impossible on clinical grounds alone to differentiate the disease. A history of grippiness frequently precedes the onset of meningeal signs. There are, ordinarily, fever, headache, vomiting, stiffness of neck; positive Kernig and Babinski. Hyperesthesia and segmental reactions may be observed. The patients are not usually as sick as in bacterial meningitis or in the encephalitic illnesses we have discussed. The spinal fluid is under increased pressure, protein is increased, and the number of cells, almost entirely lymphocytes, is usually over 500 per cu. mm.

The virus infects mice, guinea pigs and mon-

keys, producing a mononuclear meningitis, usually with an incubation period of 6 to 7 days. The pathology is almost entirely limited to the meninges and the ependyma of the choroid plexus, without encephalitis. This serves clearly to differentiate it from the viruses previously mentioned.

While the virus of lymphocytic choriomeningitis does not account for all cases of acute aseptic meningitis, the disease with which it is associated can now be sharply marked off by the character of the etiological agent.

Summary

I have attempted to place before you a brief outline of the technics followed in the isolation and identification of a filterable virus from human patients and to show how the correlation between a virus and a disease is brought about. Somewhat arbitrarily and perhaps too sketchily I have tried to show that these procedures in the

past six years have resulted in great advances in the study of respiratory and nervous diseases. They have succeeded in delimiting, from indefinite nosographic or vague clinical groups, definite etiological entities, with which evidence the construction of clear clinical criteria may develop and in the end eliminate some of the more tedious experimental studies.

It may seem that too much of the diagnosis of virus diseases is made in retrospect as a result of prolonged and detailed laboratory studies. This is inevitable. It has been equally true of bacterial infections until practical shortcuts of diagnostic value have been devised. It is important to realize that the advances come slowly but do come. As in influenza, the complement-fixation test has been found to yield evidence equal in value to that derived from the much longer and much more expensive neutralization test in mice, so other methods applicable to diagnosis early in the disease will be discovered. Differential diagnosis of the various etiological agents requires a charting of many characteristics. Differential diagnosis of the diseases caused by them must rest on clinical epidemiology in which clinical features are viewed in the light of established etiology.

Bibliography

1. Andrews, C. H., Laidlaw, P. P., and Smith, W.: Susceptibility of mice to viruses of human and swine influenza. *Lancet*, 2:859, 1934.
2. Armstrong, C., and Lillie, R. D.: Experimental lymphocytic choriomeningitis of monkeys and mice produced by virus encountered in studies of 1933 St. Louis encephalitis epidemic. *Pub. Health Rep.*, 49:1019, 1934.
3. Armstrong, C., and Wooley, J. G.: Benign lymphocytic choriomeningitis laboratory studies with virus and their possible bearing on infection in man. *Jour. A.M.A.*, 109: 410, 1937.
4. Baird, R. D., and Rivers, T. M.: Relation of lymphocytic choriomeningitis to acute aseptic meningitis (Wallgren). *Am. Jour. Pub. Health*, 28:47, 1938.
5. Bauer, J. H., and Hughes, T. P.: Preparation of graded collodion membranes of Elford and their use in study of filterable viruses. *Jour. Gen. Physiol.*, 18:143, 1934.
6. Bedson, S. P., Western, G. T., and Simpson, D. L.: Observations on etiology of psittacosis. *Lancet*, 1:235, 1930.
7. Dochez, A. R.: Limited consideration of certain aspects of acute infection of respiratory tract. *Medicine*, 12:245, 1933.
8. Eklund, C. M., and Blumstein, A.: Relation of human encephalitis to encephalomyelitis in horses. *Jour. A.M.A.*, 111:1734, 1938.
9. Elford, W. J.: New series of graded collodion membranes suitable for general bacteriological use, especially in filterable virus studies. *Jour. Path. and Bact.*, 34:505, 1931.
10. Feemster, R. F.: Outbreak of encephalitis in man due to eastern virus of equine encephalomyelitis. *Am. Jour. Pub. Health*, 28:1403, 1938.
11. Fothergill, L. D., and Dingle, J. H.: Fatal disease of pigeons caused by virus of eastern variety of equine encephalomyelitis. *Science*, 88:549, 1938.
12. Fothergill, L. D., Dingle, J. H., Farber, S., and Connerley, M. L.: Human encephalitis caused by the virus of the eastern variety of equine encephalomyelitis. *New England Jour. Med.*, 219:411, 1938.
13. Francis, T., Jr.: Transmission of influenza by filterable virus. *Science*, 80:457, 1934.
14. Francis, T., Jr.: Epidemiological studies in influenza. *Am. Jour. Pub. Health*, 27:211, 1937.
15. Francis, T., Jr., and Magill, T. P.: Direct transmission of human influenza virus to mice. *Proc. Soc. Exp. Biol. and Med.*, 36:132, 1937.
16. Francis, T., Jr., and Magill, T. P.: Direct isolation of human influenza virus in tissue culture medium and egg membrane. *Proc. Soc. Exp. Biol. and Med.*, 36:134, 1937.
17. Francis, T., Jr., and Magill, T. P.: Immunological studies with virus of influenza. *Jour. Exp. Med.*, 62:505, 1935.
18. Francis, T., Jr., Magill, T. P., Rickard, E. R., and Beck, M. D.: Etiological and serological studies in epidemic influenza. *Am. Jour. Pub. Health*, 27:141, 1937.
19. Goodpasture, E. W.: Etiological problems in the study of filterable virus diseases. *The Harvey Lectures*, 25:77, 1929-30.
20. Kelser, R. A.: Mosquitos as vector of the virus of equine encephalomyelitis. *Jour. Am. Vet. Med. Assn.*, 82:767, 1933.
21. Krumwiede, C., McGrath, M., and Oldenbusch, C.: The etiology of the disease psittacosis. *Science*, 71:262, 1930.
22. Leake, J. P.: Encephalitis in St. Louis. *Jour. A.M.A.*, 101:928, 1933.
23. Long, P. H., Doull, J. A., Bourn, J. M., and McComb, E.: Etiology of acute upper respiratory infection (common cold). *Jour. Exp. Med.*, 53:447, 1931.
24. McCordock, H. A.: Discussion—Encephalitis in St. Louis. *Jour. Pub. Health*, 23:1152, 1933.
25. Magill, T. P., and Francis, T., Jr.: Studies with human influenza virus cultivated in artificial medium. *Jour. Exp. Med.*, 63:803, 1936.
26. Meyer, K. F.: Summary of recent studies on equine encephalomyelitis. *Ann. Int. Med.*, 6:645, 1932.
27. Merrell, M. H., Lacaille, C. W., and Ten Broeck, Carl: Mosquito transmission of equine encephalomyelitis. *Science*, 80:251, 1934.
28. Muckenfuss, R. S.: Clinical observations and laboratory investigations on 1933 epidemic of encephalitis in St. Louis. *Bull. N. Y. Acad. Med.*, 10:444, 1934.
29. Muckenfuss, R. S., Armstrong, C., and McCordock, H. A.: Encephalitis: Studies on experimental transmission. *Pub. Health Rep.*, 48:1341, 1933.
30. Parker, R. F., and Rivers, T. M.: Immunological and chemical investigations of vaccine virus; preparation of elementary bodies of vaccinia. *Jour. Exp. Med.*, 62:65, 1935.
31. Rivers, T. M., and Berry, G. P.: Observations on psittacosis in mammals. *Proc. Soc. Exp. Biol. and Med.*, 27: 802, 1930.
32. Rivers, T. M., and Scott, T. F. McN.: Meningitis in man caused by filterable virus; identification of etiological agent. *Jour. Exp. Med.*, 63:415, 1936.
33. Schoening, H. W., Giltner, L. T., and Shaham, M. S.: Equine encephalomyelitis produced by inoculation of human encephalitis virus. *Science*, 88:409, 1938.
34. Scott, T. F. McN., and Rivers, T. M.: Meningitis in man caused by filterable virus; two cases and method of obtaining virus from their spinal fluids. *Jour. Exp. Med.*, 63:397, 1936.
35. Shope, R. E.: Influenza of swine and man. *The Harvey Lectures*, 31:183, 1935-36.
36. Smith, W., Andrews, C. H., and Laidlaw, P. P.: Virus obtained from influenza patients. *Lancet*, 2:66, 1933.
37. Smith, W., and Stuart-Harris, C. H.: Influenza infective of man from ferret. *Lancet*, 2:121, 1936.
38. Smorodintseff, A. A., Tushinsky, M. D., Drobyshevskaya, A. I., Korovin, A. A., and Osetroff, A. I.: Investigation on volunteers infected with the influenza virus. *Am. Jour. Med. Sci.*, 194:159, 1937.
39. Traub, E.: Filterable virus recovered from white mice. *Science*, 81:298, 1935.
40. Tyzzer, E. E., Sellards, A. W., and Bennett, B. L.: The occurrence in nature of "equine encephalomyelitis" in the ring-necked pheasant. *Science*, 88:505, 1938.
41. Webster, L. T., and Fite, G. L.: Virus encountered in study of material from cases of encephalitis in St. Louis and Kansas City epidemics of 1933. *Science*, 78:465, 1933.
42. Webster, L. T., and Fite, G. L.: St. Louis encephalitis: serological relation to Japanese encephalitis and experimental studies on immunity. *Science*, 79:254, 1934.
43. Webster, L. T., and Wright, F. H.: Recovery of eastern equine encephalomyelitis virus from brain tissue of human cases of encephalitis in Massachusetts. *Science*, 88:305, 1938.
44. Wesselhoeft, C., Smith, E. C., and Branch, C. F.: Human encephalitis; eight fatal cases with four due to virus of equine encephalomyelitis. *Jour. A.M.A.*, 111:1735, 1938.

THE RATIONALE OF BILE SALT THERAPY IN BILIARY TRACT DISEASE*

A. C. IVY, Ph.D., M.D., and A. L. BERMAN, M.S.†
Chicago, Illinois

THE rational therapeutic use of bile salts depends on an understanding of their functions and activities in the economy of the body. Thus, it is appropriate to list their known functions and activities.

1. The bile salts promote the formation of bile. They increase the volume output and the total cholesterol output, but do not materially affect the pigment output in a normal animal.

Natural bile salts "thin" the bile chiefly by decreasing its viscosity and not by decreasing its content of total solids per c.c.

2. Bile salts by keeping fatty acids in solution at the acid reaction of gallbladder bile prevent the precipitation of cholesterol and fatty acids in the gallbladder.^{40,41}

3. The natural bile salts aid in the digestion and absorption of fats. They facilitate the ac-

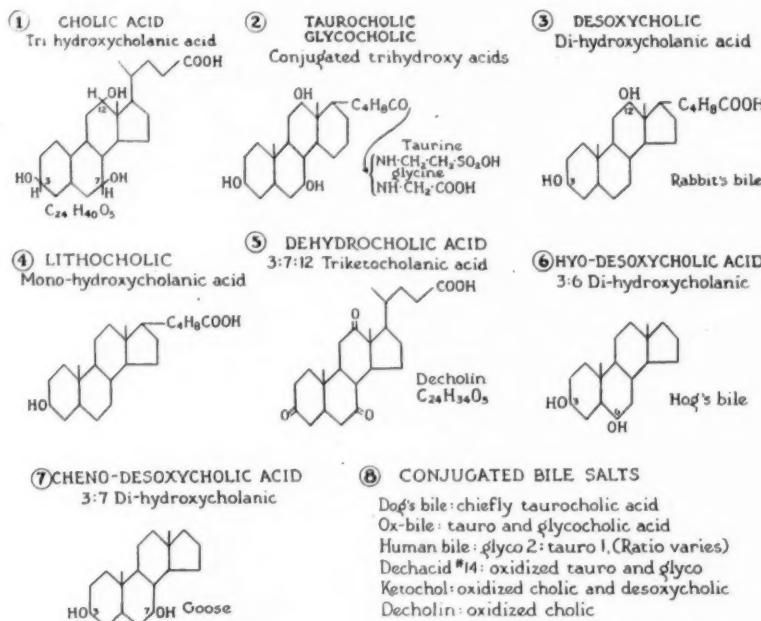


Fig. 1.

Whether bile salts will increase pigment output when there is some retention of pigment due to excessive hemolysis or hepatitis has not been satisfactorily demonstrated. When *natural bile salts*, that is, the bile salts made by the liver of a normal animal, are given enterally, the bile salt is absorbed and all but about 10 per cent is reexcreted in the bile. Where the 10 per cent loss occurs is unknown.

tion of lipase and some believe of amylopsin and trypsin. Dehydrocholic acid (Fig. 1) is said not to facilitate the action of lipase like most other bile acids. Animals like the cat, dog and man, which possess a liver which forms relatively small quantities of bile, have a gallbladder which concentrates and stores hepatic bile apparently for digestive purposes.

4. Natural bile salts facilitate the absorption of iron and calcium and are necessary for the absorption of carotene, the precursor of vitamin A, and for the absorption of vitamins D, E,

*Read before the annual meeting of the Minnesota State Medical Association, Minneapolis, May 31, 1939.

†From the Department of Physiology and Pharmacology, Northwestern University Medical School, Chicago.

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and K.^{12,13,14,15,42,43} The evidence indicates that desoxycholic acid, not tauro or glycocholic acid or dehydrocholic acid, is responsible for the absorption of carotene.^{12,13,14,15} We have no such clear-cut information regarding vitamins D, E and K, although various bile-salt preparations are reported to promote the absorption of vitamins D and K.^{6,28} Desoxycholic acid is present in the bile of man, and to a more or less extent in the bile of other animals.^{7,8,35} Desoxycholic acid is now available commercially (degalol) and has been used clinically to promote the absorption of vitamin K. Desoxycholic acid is present in ox-bile salts, which contain usually from 10 to 20 per cent.³⁰ Bile salts facilitate the absorption of sterols, such as cholesterol.

5. Bile salts given orally have a laxative action. They stimulate intestinal motility. The dose required for laxation varies. It depends, in normal dogs, on the amount of bile salts being manufactured by the liver. The greater the bile salt excreted and passed into the intestine, the less the bile salt required orally to elicit diarrhea. Of course, in the human patient, the diet and the sensitivity of the colon are additional factors affecting the dose required for laxation. When bile salts provoke diarrhea, then bile salts may be found in the stools.³³ Along with dietary factors, bile salts are natural laxatives, in our opinion.

6. Bile salts are said to play an important rôle in detoxifying bacterial toxins in the intestinal tract.²⁰ Bile salts are anti-putrefactive and inhibit *B. coli*, but are not general antisepsics.^{21,35}

7. Some evidence indicates that, when bile salts are being secreted, liver glycogen is diminished.^{32,34} Several observers claim that bile salts increase glycogen deposition.^{23,25,44} None of the evidence on this point is complete or satisfactory.

8. Although bile salts increase the cholesterol output, the increase in bile acids in the bile is much greater than the increase in cholesterol. Thus bile salts orally can favorably influence the bile-salt-cholesterol ratio, if the liver is normal or is secreting bile salts.^{22,23}

When an obstruction of the bile duct is relieved, the first bile obtained usually contains pigment, if the hepatitis is not severe, but it

contains no bile salts.²² The liver secretes pigment when it does not secrete bile salts. Bile salts may not appear in the bile until five or more days postoperatively.^{22,28} The bile obtained postoperatively is frequently in practice returned to the patient. When this is done very little or no cholic acid is returned to the patient. When it is desirable to give such post-operative patients bile salts, one should give the patient desiccated animal bile or some preparation of bile salt. Whether the administration of bile salt increases the excretion of pigment or favors the recovery from hepatitis and regeneration of the liver has not been established. In fact, bile salts may be given to some patients after the relief of obstruction and none may be observed to be excreted in the bile. What happens to the bile salt given is unknown. Thus, when one gives bile salts to a patient with obstruction or early after the relief of an obstruction, the bile salt can only operate, so far as present evidence permits a definite statement, by improving the activities of the alimentary tract.

The Choice of Bile Salts for Therapy

The physician well knows that many preparations of bile and bile salts are available, such as dried whole ox or hog's bile, the natural ox-bile salts with and without iron, and the oxidized bile salts. Tablets are also available which contain relatively little bile salt in contrast to the cathartic drug they contain; in fact they contain so little bile salt that the little present might as well be omitted.

Most of our work to date has involved a study of the metabolism of the unoxidized conjugated (sodium taurocholate and sodium glycocholate) natural bile salts and the oxidized unconjugated ("decholin" and "ketochol") and oxidized conjugated (Wilson Laboratories, dechacid) bile salts and acids in bile fistula dogs. (It should be added that this is not a simple subject because the biliary fistula method is a difficult one and because our knowledge of the complex subject of the chemistry of bile and the bile acids and their metabolism is meager.)

The oxidized bile salts, such as "decholin" and "ketochol," when given intravenously are less toxic than the natural unoxidized bile salts. "Decholin," or sodium dehydrocholate, because of its purity, is probably the best bile salt now

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available for intravenous use. Since bile salts are so readily absorbed from the intestine, there is no indication for intravenous therapy other than perhaps to obtain a "priming" effect on the liver.

It has been argued that the salts of oxidized bile acids are preferable to the unoxidized bile acids for oral therapy because the oxidized bile acids show less systemic toxicity, and hence tend to cause less hemolysis in the portal blood and less injury to the liver. This contention, although non-teleological, may be true in part, but it has not been established by *in vivo* experimentation.

In regard to the effect of the intestinal absorption of various bile salts on the erythrocytes in the portal blood, it has not been shown that the erythrocytes are more "fragile" when unoxidized salts are being absorbed than when oxidized salts are being absorbed in equivalent amounts. Neither has it been shown that more bile pigment is excreted in the bile when unoxidized bile salts are given than when oxidized bile salts are given. Our results show that when 3 or 5 grams of ox-bile salts are given orally, 112 mgm. (average of twenty-five dogs) of pigment are excreted daily; and when 3 grams of "ketochol" or "decholin" are given, 113 mgm. of pigment are excreted by the normal dog on a controlled diet. If the absorbed bile salt injured the red cells differentially, the pigment outputs observed should not have been the same.

In regard to the effect of oxidized and unoxidized bile salts on the liver, we have found that neither 3 nor 5 grams of unoxidized oxbile or dog's bile salts depress natural cholic acid synthesis. Three grams of oxidized bile salt, as decholin or ketochol, do not significantly depress natural cholic acid synthesis; but 5 grams may occasionally depress natural cholic acid synthesis. This depression of natural cholic acid synthesis by oxidized bile salts raises the question of their toxic action on the liver because natural bile salt synthesis is depressed by toxic and infectious hepatitis as well as by obstruction. However, it is possible that the depression is due to some factor other than toxicity—for example, simple replacement. To test this possibility we have fed normal dogs 3 grams of oxidized bile salt (decholin and ketochol) daily for several months. During this period the liver function was tested

by the bromsulphthalein clearance test. When the period was terminated, the liver was assayed for glycogen and fat. No change from normal was observed. We are now repeating the experiments with 5 grams of oxidized bile salt. Of course, this dose of bile salt, 75 grains daily, is relatively much larger than any dose that might be used in human therapy. But, we are interested in the question from an academic as well as a practical viewpoint, and it is possible that a diseased liver may be more sensitive to a bile salt that depresses cholate synthesis than a normal liver. On the contrary, an oxidized bile salt with low systemic toxicity may be preferable.

The selection of a bile salt for therapeutic purpose is not as simple as it might appear to be from a superficial examination. Other effects of the bile salt than its systemic toxicity and ability to increase the volume output of bile (hydrocholeresis) should be considered. The following physiological analysis includes the more important points that require consideration and investigation before one can say that one preparation is superior to another for a general or a particular therapeutic indication.

Points to be considered in the selection of a bile salt or acid for therapeutic purposes:

1. The effect of long continued amounts on the liver.
2. The effect on the composition of the bile.
 - a. Fluidity and total volume output of bile.
 - b. Bile salt content.
 - (1) Natural bile salt content.
 - (2) Bile salt content most favorable for the solution of cholesterol and fatty acids.
 - (3) Bile salt content least favorable for absorption by gallbladder mucosa.
 - (4) Bile salt content most favorable for intestinal absorption.
 - (5) Bile salt content as related to laxation.
 - c. Cholesterol output in bile.
 - d. Pigment output.
 - e. Fatty acid output.
3. General toxicity.
4. Gastro-intestinal irritation, including absorbability of the bile salt and laxative action.
5. The effect of the bile salt on the absorption of fat and vitamins and minerals.

As stated above, if one believes that the patient should receive bile-salt therapy intravenously, then a pure preparation of low systemic toxicity should be used. For oral use, the question of toxicity does not have to be so seriously considered, though the matter of gastric and intestinal irritation may be worthy of consideration. Whether one should select a preparation of dried, whole bile or a preparation of bile salts cannot be an-

swered categorically at present. However, according to existing knowledge, the only active ingredient in bile is the bile acids. Dried, whole bile will contain presumably all the natural bile acids, whereas a bile salt preparation may not, since bile salt preparations may vary widely depending on how they are made and on their source. The hydrocholeretic effect of the bile preparation will depend on its bile salt content and its content of the various types of bile acids. A sufficient amount of comparative evidence does not exist at present for us to state which preparations are better for oral therapy. When hydrocholeresis is the sole desideratum, the salts of the oxidized bile acids, decholin and ketochol, per gram weight are preferable, according to our extended observations on the dog. If one desires to increase the elimination in the bile of the natural bile salts, then some preparation of natural bile salts should be used.

Indications

In the absence of bile salts in the intestine the oral administration of bile salts is indicated to improve digestion and absorption.—The rôle that bile salts play in the absorption of vitamins D and K and fats are alone sufficient indications. In this connection, it should be pointed out that the presence of bile pigment in the feces does not necessarily indicate that bile salt is being secreted in the bile. The liver may excrete pigment when it does not form and secrete bile salts. Frequently in biliary tract disease, in the absence of total obstruction, sufficient hepatitis may be present to prevent and markedly diminish bile salt synthesis but not to prevent bile pigment excretion. Thus, bile salt deficiency in digestion may occur in the presence of pigmented feces.

The question of the possible harmfulness of giving bile salts when the common duct is obstructed or when hepatitis is present deserves consideration. This question, to our knowledge, has not been adequately investigated. Several years ago we obstructed the common duct of eight dogs and gave bile to four of them and not to the other four. No significant difference in the postoperative length of life of the two groups was observed. This is too small a series, however, on which to base a conclusion. Of course, bile salts have now been given

orally for a short period of time to many jaundiced patients without evident harm.

In biliary tract disease, without acute hepatitis, bile salts are administered to flush the biliary passages with a copious flow of low viscosity.—In other words, bile salts may be used with the hope of counteracting a tendency toward stasis and its effects. At least, the administration of bile salts is the only known way of producing and maintaining a copious flow of bile through the biliary passages. To obtain this effect, however, the patient must have a liver that will secrete bile salts.

Flushing of the bile ducts.—A brisk flow of fluid through the hepatic ducts would tend to prevent ascending infection. In our work with biliary fistula dogs we have found that ascending infection, cholangitis and hepatitis, rarely occurs as long as the animal receives bile salts or its own bile. If cholangitis did occur, sediment and concrements would be less likely to collect on the inflamed mucosa of the ducts. Also, bile of low viscosity would have less difficulty passing through an hypertonic sphincter of Oddi than viscous bile. Goldman and Ivy¹¹ have found recently that a liver secreting copiously in response to bile salts is difficult to inhibit reflexly by distention of the colon or stimulation of the mesenteric nerves. They found further that distention of the colon or stimulation of the colonic nerve would cause a contraction of the sphincter of Oddi. Thus, abnormal activity of the colon tends to cause stasis on two counts: (1) a decrease in bile formation or the formation of more viscous bile; and (2) an increase in the resistance offered by the sphincter. Since bile salts are laxative, a lack of bile salts would increase the tendency toward constipation and the increase in constipation would further affect the liver and sphincter, thus possibly setting up a vicious circle that is broken best by the oral administration of bile salts.

Flushing of the gallbladder.—To what extent the administration of bile salts will change the chemistry of the bile in the gallbladder and will flush out the gallbladder is uncertain. This question is of obvious practical importance.

In the latter part of pregnancy, Gerdes and Boyden¹⁰ have shown that the gallbladder evacu-

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ates more slowly than normal. Potter²⁷ and Riegel, Ravdin and others^{29,31} have found that the bile in the gallbladder of pregnant women near term tends to be high in cholesterol and low in bile acid. It is believed that in gallbladder stasis, bile acid tends to diffuse out of the bile into the blood. This obviously would favor precipitation of cholesterol and production of a viscid bile. Whether the administration of bile salt would counteract this change in the chemistry of bile, though likely, is undetermined.

Neither has it been shown that the administration of bile salts will tend to flush out the gallbladder.—It is possible that "flushing" or a "washing out" of the gallbladder might be obtained by giving bile salts and then fat to empty the gallbladder, and then repeating the procedure three or four times daily. In support of this possibility several pertinent observations may be cited. A number of observers have reported that the administration of bile salts increases the cholecystographic image of the gallbladder and also increases the rate of visualization.^{1,2,4,9,16,17,18,19,24,26,38,39} This indicates that when bile is being formed copiously some of the bile actually enters the gallbladder as might be expected. Jenkinson¹⁹ has reported that by giving bile salts and a diet relatively rich in fat, he obtained normal gallbladder pictures in eight patients who previously had non-filling gallbladders. More convincing evidence has been provided by Bech and others.³ Using dogs, they found that bile salts given orally during a period of eleven or more days caused a decrease in the total solids and the acidity of the gallbladder bile. Such changes indicate the occurrence of a sort of flushing action in that the gallbladder bile was thinner and its reaction was made more like that of hepatic bile. Hepatic bile is alkaline; gallbladder bile is, normally, slightly acid. However, it must be remembered that if the gallbladder does not fill in acute or chronic cholecystitis then a copious flow of bile would only accomplish a flushing of the bile ducts.

In the presence of biliary tract disease and acute hepatitis the use of bile salts is implied to be of benefit by a number of clinical observers, especially after the relief of a common duct

obstruction. Until more unequivocal observations become available, we shall continue to doubt the wisdom of bile salt therapy in such a condition except for the purpose of improving intestinal absorption.

It must not be forgotten that the administration of bile salts except in the presence of acholic stools is an allopathic procedure. It is only an etiologic or a scientifically directed procedure when it can be shown by direct laboratory tests that the liver and biliary tract of the patient are functioning abnormally and bile-salt substitution or addition therapy is necessary and will correct the disturbance.

References

1. Adler, A.: Über die Entleerung der mit Tetrajodphenolphthalein gefüllten Gallenblase. *Mit aus den Grenz. der Med. u. Chir.*, 40:196, 1927.
2. Adler, A., and Schmid, E.: Die Diagnostische und Therapeutische Verwendbarkeit der Gallensäuren und des Tetrachlorphenolphthaleins bei Erkrankungen der Leber und Gallenwege. *Fortschr. d. Therap.*, 1:733, 772, 807, 1925.
3. Beck, F. F., Krautz, J. C., Feldman, M., and Carr, C. J.: Hydrogen-ion concentration of the gall bladder bile of the dog. *Proc. Soc. Exp. Biol. Med.*, 37:357, 1937-38.
4. Biedermann, F., and Becher, G.: Beitrag zur "Schnellen" Cholezystographie. *Deutsch. med. Wochenschr.*, 60:577, 1934.
5. Butt, H. R., Snell, A. M., and Osterberg, A. E.: The use of vitamin K and bile in treatment of the hemorrhagic diathesis in cases of jaundice. *Proc. Mayo Clinic*, 13:74, 1938.
6. Butt, H. R., Snell, A. H., and Osterberg, A. E.: Further observation on the use of vitamin K in the prevention and control of the hemorrhagic diathesis in cases of jaundice. *Proc. Soc. Mayo Clinic*, 13:753, 1938.
7. Doublet, H.: Differential analysis of bile acids in human bile from fistulas. *Arch. Surg.*, 34:149, 1937.
8. Doublet, H.: Hepatic excretion in man of the various bile acids following their oral administration. *Proc. Soc. Exp. Biol. Med.*, 36:50, 687, 1937.
9. Geling, J.: Der Verbesserung der Röntgenologischen Darstellung der Gallenblase. *Deutsch. med. Wochenschr.*, 54: 1928, 1928.
10. Gerdes, M. M., and Boyden, E. A.: Rate of emptying of the human gall bladder in pregnancy. *Surg., Gynec. and Obst.*, 66:145, 1938.
11. Goldman, L., and Ivy, A. C.: The effect of distention of the colon and stimulation of its nerve supply on the bile from the liver. *In press*.
12. Greaves, J. D., and Schmidt, C. L. A.: Rôle played by bile in the absorption of vitamin D in the rat. *Jour. Biol. Chem.*, 102:101, 1933.
13. Greaves, J. D., and Schmidt, C. L. A.: Relation of certain bile acids to absorption of B-carotene in the rat. *Proc. Soc. Exp. Biol. Med.*, 36:434, 1937.
14. Greaves, J. D., and Schmidt, C. L. A.: Relation of bile to absorption of vitamin E in the rat. *Proc. Soc. Exp. Biol. Med.*, 37:40, 1937.
15. Greaves, J. D., and Schmidt, C. L. A.: On the absorption and utilization of carotene and vitamin A in cholecodochoclonostomized vitamin A deficient rats. *Am. Jour. Physiol.*, 111:492, 1935.
16. Impallomeni, R.: Per una pier fisiologica indagine colecistografica. *Radiol. Med.*, 25:583, 1938.
17. Jankelson, T. R.: Decholin-sodium in cholecystography. *Radiology*, 21:448, 1933.
18. Jankelson, T. R., and Altman, W. S.: Decholin-sodium in cholecystography. *New Eng. Jour. Med.*, 206:796, 1932.
19. Jenkinson, E. L.: Cholecystography. *Jour. A.M.A.*, 107: 755, 1936.
20. Jordan, E. O., and Falk, I. S.: *New Knowledge of Bacteriology and Immunology*. Chicago: Univ. of Chicago Press, 1928, p. 185.
21. Jordan, E. O., Russell, H. L., and Zeit, F. R.: Longevity of typhoid bacillus in water. *Jour. Inf. Dis.*, 1:641, 1904.
22. Kohlstaedt, K. G., and Helmer, O. H.: Effect of the oral administration of bile salts on the composition of human fistula bile. *Am. Jour. Dig. Dis.*, 4:306, 1937.
23. Kuramoto, T.: Beiträge zur Kenntnis der Glykogenbildung der Leber durch Gallensäure. *Jour. Biochem. (Japan)*, 19:315, 1934.

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24. Lutz, W., and Seyfried, H.: Der Einfluss von Galle und Gallensäuren Salzen auf die Resorption von Tetrajodophenolphthalein. *Wien. Klin. Wochenschr.*, 52:226, 1939.

25. Misaki, K.: Bedeutung der Gallensäuren im Kohlenhydratstoffwechsel. *Jour. Biochem. (Japan)*, 8:235, 1928.

26. Nissen, K.: Fortschritte der durch die Cholecystographie gegebenen diagnostischen Befunde von Morphologie und Funktion des Gallengangsystems, insbesondere der Gallenblase. *Deutsch. med. Wochenschr.*, 59:1704, 1933.

27. Potter, M. G.: Observations of gall bladder and bile during pregnancy at term. *Jour. A.M.A.*, 106:1070, 1936.

28. Ravidin, I. W., Johnston, E. G., Riegel, C., and Wright, S. L.: Study of human liver bile after release of common duct obstruction. *Jour. Clin. Invest.*, 12:659, 1933.

29. Riegel, C., Ravidin, I. S., Johnston, C. G., and Morrison, P. J.: Studies of gall-bladder function. XIII. The composition of gall-bladder bile and calculi in gall-bladder disease. *Surg., Gynec. and Obst.*, 62:933, 1936.

30. Rhodes, J. E.: Relation of vitamin K to the hemorrhagic tendency in obstructive jaundice, with a report on cereophil as a source of vitamin K. *Surgery*, 5:794, (May) 1939.

31. Riegel, C., Ravidin, I. S., Morrison, P. J., and Potter, M. G.: Studies of gall bladder function. XI. Composition of the gall bladder bile in pregnancy. *Jour. A.M.A.*, 105:1343, 1935.

32. Saadi-Nasim, and Usuelli, F.: Influence des injection intraveineuses de bile sur la sécrétion biliaire et sur la glycémie. *Jour. de physiol. et de path. gen.*, 25:43, 1927.

33. Schmidt, C. R., Berman, A. L., Ivy, A. C., and Atkinson, A. J.: Studies on the secretion of bile. *Am. Jour. Physiol.* (in press).

34. Seckel, H. P. G., and Kato, K.: Development of the diurnal cycle of liver function in nursing rats. Chemical and histologic study of the content of glycogen and of bile acids in the liver cell. *Arch. Path.*, 25:347, 1938.

35. Sobotka, H.: In *Physiological Chemistry of Bile*. Baltimore: Williams and Wilkins Co., 1937, p. 125.

36. Stewart, H. L., and Cantarow, A.: Renal lesions following injection of sodium dehydrocholate in animals with and without biliary stasis. *Arch. Path.*, 20:866, 1935.

37. Tashiro, S.: Nature of gastric-ulcer producing substance isolated from muscle. *Jour. Biol. Chem.*, 119:xcviii, 1937.

38. Taterka, H.: Über eine Verbesserung der Röntgendiagnostik der Gallenblase. *Med. Welt*, 4:1722, (Nov. 29) 1930.

39. Taterka, H.: Cholezystographische Untersuchungen mittels "Decholinisierung" und "Eigelbenteerung." *Röntgenproxis*, 3:721, (Sept. 16) 1931.

40. Walsh, E. L.: Etiology of gall stones. *Arch. Path.*, 15:698, 1933.

41. Walsh, E. L., and Ivy, A. C.: Observations on etiology of gallstones. *Ann. Int. Med.*, 4:134, 1930.

42. Warner, E. D., Brinkhous, K. M., and Smith, H. P.: Bleeding tendency of obstructive jaundice: Prothrombin deficiency and dietary factors. *Proc. Soc. Exp. Biol. Med.*, 37:628, 1938.

43. Warner, E. D., Brinkhous, K. M., and Smith, H. P.: Prothrombin deficiency and the bleeding tendency in obstructive jaundice and in biliary fistula. Effect of feeding bile and alfalfa (vitamin K). *Am. Jour. Med. Sci.*, 196:50, 1938.

44. Watanabe, K.: Bedeutung der Gallensäure im Kohlenhydratstoffwechsel. XXI (2). Mitteilung: Glykogen und Glykolyse in der Leber und im Muskel durch Gallensäure und Adenylpyrophosphorsäure. *Biochem. Z.*, 274:268, 1934. (Biochemische Zeitschrift).

45. Yosida, T.: Some contributions to the studies on gastric ulcers by bile acids. *Fukuoka Acta Med.*, 31:133, 1938.

THE SCOPE OF SURGERY IN THE CONTROL OF PULMONARY TUBERCULOSIS*

HERBERT A. CARLSON, M.D.

Ah-Gwah-Ching, Minnesota

THE scope of collapse therapy for pulmonary tuberculosis has been broadened in recent years, partly by the development of new or improved technics, but largely by a more aggressive use of methods which, for the most part, are not new. In some institutions the indications have been extended to a point where more than three-fourths of the patients receive the benefits of one or more of the several means now available for resting, relaxing or collapsing the lung.

There are, undoubtedly, limits beyond which a reasonable program of collapse therapy cannot be extended. In one group of patients surgery may be unnecessary; in another, futile or meddlesome; and as the composition of tuberculous populations may vary in different sanatoria as to stage, pathological characteristics and constitutional reactions, the scope of collapse therapy in different institutions likewise will vary.

Furthermore, there are legitimate differences of opinion regarding the indications for the various procedures. Alexander, for example, employs a variety of operations beginning with the simplest that has a reasonable chance of con-

trolling the disease and resorting to the more radical procedures as required. He employs active therapy for both exudative and productive tuberculosis, whether cavities are present or not. Coryllos, on the other hand, regarded the presence of cavitation as the sole indication for surgery.

Admissions to Minnesota State Sanatorium

The present study was undertaken to evaluate the rôle of collapse measures in the management of patients at the Minnesota State Sanatorium, an institution devoted to the care of tuberculous patients who come chiefly from agricultural communities and the smaller cities of Minnesota. For this purpose the records and x-rays of all patients admitted during 1938 were reviewed. It is realized that not sufficient time has, as yet, elapsed for a final evaluation of end-results, but sufficient information has been obtained to justify a preliminary report on clinical experience with a variety of surgical procedures.*

In 1938 there were 291 new patients admitted to the Minnesota State Sanatorium, eighty-six of whom were Indians. As the tuberculous Indians

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*The data were collected as of April 1, 1939.

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TABLE I. THERAPY OF 172 PATIENTS WITH ACTIVE PULMONARY TUBERCULOSIS

	Number of Patients	Percentage
1. No collapse therapy	79	46
2. Unsuccessful pneumothorax (only)	10*	
3. Unilateral pneumothorax	28	
4. Bilateral pneumothorax	1	
5. Intrapleural pneumonolysis	11	
6. Pneumothorax—Oleothorax (one contralateral pneumothorax)	3	
7. Pneumothorax—Phreniphraxis (one contralateral)	8	
8. Phrenic Nerve Operation	23	
9. Phreniphraxis—Pneumoperitoneum	3	
10. Pneumoperitoneum	3	
11. Thoracoplasty	3	
Successful induction of pneumothorax	51†	
Phrenic Nerve Operations	34	
	93	54

*Unsuccessful induction of pneumothorax totalled 23 in 21 patients (30%)

†Successful induction of pneumothorax totalled 53 in 51 patients (70%)

present problems quite different from those of their white contemporaries, they are excluded from consideration at this time. Among the 205 white patients, thirty-three did not have active pulmonary tuberculosis and were classified as follows: non-tuberculous thirteen, first infection three, inactive eight, extra-pulmonary tuberculosis nine. The therapy of the 172 white patients who had active pulmonary tuberculosis has been tabulated (Table I).

No Collapse Therapy

No form of collapse therapy was given to a group of seventy-nine patients, or 46 per cent of those with active pulmonary tuberculosis (Table I). Among these were six patients with negative sputum who did not appear to be in need of collapse therapy, two senile patients and sixty-one patients for whom collapse therapy appeared to be definitely contraindicated because of extensive bilateral disease, miliary tuberculosis, renal tuberculosis, peritonitis, enteritis or meningitis. The latter group consisted almost exclusively of patients classified as pre-terminal.

On the other hand there were five patients for whom some form of collapse therapy had been recommended (four refused), and five patients who might possibly benefit by such treatment (four were transferred or left against advice).

Thirty-five patients who had no collapse are already dead, three to fifteen months after admission, a mortality of 44 per cent as contrasted with a mortality of 6.4 per cent in the group selected for collapse therapy.

Pneumothorax

The ninety-three patients (54 per cent) for whom some form of collapse was attempted

(Table I) includes ten cases of unsuccessful pneumothorax, two of which were bilateral. Pneumothorax was judged unsuccessful when it could not be induced or when it was discontinued after a few refills. Unsuccessful induction of pneumothorax, however, also occurred among patients who later had other procedures. Altogether, unsuccessful induction of pneumothorax (unilateral and bilateral) occurred twenty-three times in twenty-one patients. Successful induction occurred fifty-three times in fifty-one patients. Pneumothorax, therefore, was successful in only 70 per cent of the attempts.

The term "successful" as applied to pneumothorax, however, is a misnomer as in only twelve (22 per cent) could the collapse be referred to as good or excellent. In fifteen (28.3 per cent) restraining adhesions may or may not compromise the clinical result, eleven (20.7 per cent) have already required pneumonolysis. In 7 (13 per cent) supplementary phreniphraxis has been performed, three (5.7 per cent) have been converted to oleothorax, and in five (9.4 per cent) collapse appears to be inadequate and abandonment of pneumothorax should be considered.

Despite the handicap of restraining adhesions and the need of supplementary operations, pneumothorax is still a most effective weapon in the control of tuberculosis. About one-half of the patients carrying pneumothorax already have negative sputum* and apparent closure of cavities. Others have not been observed long enough to justify even a preliminary evaluation of results.

*The sputum status of patients in this series can be reported only tentatively, although some have had guinea pig inoculations.

Intrapleural Pneumonolysis

Wherever pneumothorax is employed, a certain number (14.8 per cent, according to Anderson and Alexander) will be found who require

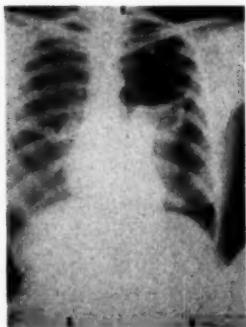


Fig. 1A

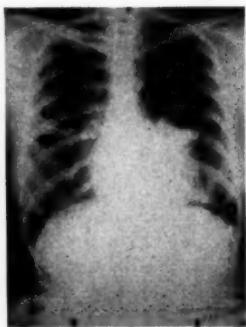


Fig. 1B

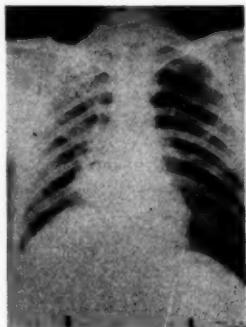


Fig. 2A

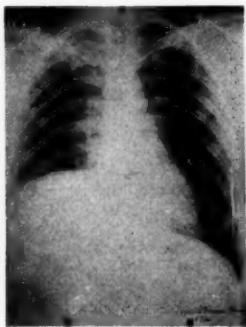


Fig. 2B

Fig. 1. A—Roentgenograms taken November 22, 1938. Pneumothorax left, with suspended cavity in upper portion of lower lobe. B—Roentgenogram taken March 18, 1939. Cavity is closed following intrapleural pneumonolysis. No tubercle bacilli were found in sputum.

pneumonolysis. Of our patients who had pneumothorax successfully induced in 1938, eleven (20.7 per cent) have already had this operation. Although care and discrimination are needed in selecting patients for pneumonolysis, the operation naturally follows the affirmative answer to two questions: Is division of adhesions necessary? Is the operation technically possible?

Frequently the answer to the second of these questions is not made clear by x-ray examination. When doubt exists thoracoscopy is indicated. The operation was entirely successful technically in eight of the eleven cases reported here (Fig. 1, A and B); the other three were only partially successful as all restraining adhesions could not be divided. One patient who had a partially divided, short, thick adhesion remaining after an extensive cauterization of bands and cords, apparently has a satisfactory result as a consequence of stretching of the partly cauterized adhesion. At some future date this adhesion can be divided completely if necessary but at present the collapse appears to be adequate.

Seven of the eleven patients who have had pneumonolysis have negative sputum and closed cavities. In two cases the results are in doubt and two appear to be failures due to technical difficulties.

Oleothorax occupies a limited but valuable field. Three of the pneumothorax patients have already had oleothorax. One was instituted be-

Oleothorax

cause progressive adhesions threatened to obliterate the pleural space. The second was used to control a left tuberculous empyema in a patient who had bilateral pneumothorax. In this case the empyema appears to be cured, and the right pneumothorax has been abandoned. The third represented an attempt to treat a pyopneumothorax present on admission. In this case oleothorax has been abandoned and thoracoplasty recommended because of the demonstration of the presence of a bronchial fistula. All three of these patients have negative sputum.

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Phrenic Nerve Operations

There has been a great deal of controversy regarding the value of phrenic nerve operations because different surgeons have employed phrenic nerve paralysis under circumstances that were entirely different. If one contends with Coryllos that the only purpose of collapse therapy is to close cavities, it must be admitted that operations on the phrenic nerve have a very restricted use. On the other hand, if one accepts the broader indications of Alexander, phreniphraxis becomes an important part of the management of tuberculosis.

Phreniphraxis was performed in the present series on thirty-four patients: as an independent

procedure (on twenty-three patients), as a means of improving pneumothorax (on eight patients) and combined with pneumoperitoneum (on three patients). Phreniphraxis was considered to be the operation of choice when the disease was minimal or moderately advanced, chiefly unilateral, without cavitation or with small cavities (1-3 cm.). It was employed as a second choice when the disease was more extensive and larger cavities were present following unsuccessful attempts to induce pneumothorax. It was also used for hemoptysis, to increase the collapse of an incomplete pneumothorax when the lung was adherent to the diaphragm, in conjunction with pneumothorax for the contralateral lung in lieu of an unsuccessful attempt to induce bilateral pneumothorax and following abandonment of pneumothorax.

Nine of the twenty-three patients who had phreniphraxis as an independent procedure had negative sputum on admission. Some progression of the disease occurred in one of these; the condition is improved or stationary in the others. Fourteen had positive sputum on admission, six of whom are now negative. Nine had cavities varying in diameter from 2 to 8 cms. Three cavities measuring 2 to 5 cm. now appear to be closed. An interesting result was obtained in the case of a young man who refused pneumothorax but accepted phreniphraxis (Fig. 2, A and B). On the basis of these early data it appears that improvement occurred in at least one-half of the patients who had phreniphraxis alone.

Phreniphraxis supplementary to an inadequate pneumothorax was apparently successful in three of the eight instances in which this combination was used.

Pneumoperitoneum

Pneumoperitoneum was used in three instances to enhance the effect of a phreniphraxis. It was also employed in three cases of bilateral disease when pneumothorax was unsuccessful or contraindicated. Although improvement followed the use of pneumoperitoneum in one patient, no decisive results were observed.

Thoracoplasty

The small number of thoracoplasty patients among those admitted to the Sanatorium in 1938

(Table I) is due to the fact that they had been under observation only three to fifteen months when the data were collected and both patient and physician were reluctant to accept a major surgical procedure until simpler measures had been given a thorough trial. One patient in the group of unsuccessful pneumothoraces and one with empyema in whom oleothorax was abandoned are in need of thoracoplasty. Others who have had pneumothorax attempted unsuccessfully or who have inadequate pneumothorax or who have failed to obtain the desired result from phreniphraxis will soon become candidates for thoracoplasty. Often because of bilateral disease, a long period of preparation is needed before the operation can be undertaken with a reasonable hope of success. The number that will eventually require thoracoplasty and attain a condition permitting its performance cannot yet be estimated with accuracy.

Comment

Six different collapse procedures have already been employed in the treatment of the 172 patients referred to in this report. Operations that were not used include extrapleural pneumonolysis with packing or with extrapleural pneumothorax. The latter especially is receiving much attention in current literature and if the reports continue to be favorable, extrapleural pneumothorax will be recommended for selected patients with adherent pleurae when contraindications to thoracoplasty exist.

The percentage of patients in this series receiving therapy (54 per cent) is not so high as that reported by Leslie and Anderson (78.8 per cent of patients admitted from June 1, 1930, to July 1, 1934, including those in residence on June 1, 1930) although as time passes a few additional patients among those under discussion may eventually require some form of surgery. Reference has been made above to five patients for whom collapse procedures were recommended and five patients who might have benefited by such treatment in addition to the ninety-three in the treated group. The theoretical maximum number of patients, in this series, treatable by collapse measures up to the present time, therefore is 103 (60 per cent).

Review of records and x-rays reveals strikingly that there are still numerous examples of

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lost opportunities resulting from late diagnosis. The emphasis, therefore, must again be reverted to a program of case finding, for earlier diagnosis will not only permit a greater utilization of collapse measures but insure better results among those so treated.

Conclusions

1. A program of collapse therapy must include a variety of procedures.
2. Intrapleural pneumonolysis is indicated in about 10 to 20 per cent of cases of successfully induced pneumothorax.
3. Phreniphraxis is of value alone or supplementary to other procedures.
4. Thoracoplasty has won an accepted place in the program of collapse therapy.

5. Oleothorax, pneumoperitoneum and extra-pleural pneumothorax are useful procedures in the treatment of selected patients.
6. The percentage of patients suitable for collapse therapy varies in different institutions.
7. Further extension of the benefits of surgery may be made possible by earlier diagnosis.

References

1. Alexander, John: *The Collapse Therapy of Pulmonary Tuberculosis*. Springfield: Charles G. Thomas, 1937.
2. Anderson, R. S., and Alexander, J.: Closed and open intrapleural pneumonolysis: Results in one hundred and eleven cases and twenty-nine cases, respectively. *Jour. Thor. Surg.*, 6:502, 1937.
3. Coryllos, Pol N.: *The surgery of pulmonary tuberculosis*, Part I. *Quart. Bull. Sea View Hosp.*, 1:89, 1935.
4. Leslie, G. L., and Anderson, R. S.: Intensive collapse therapy in pulmonary tuberculosis, I. A study of the extent and results of such a program in a group of 1,124 patients. *Am. Jour. Med. Sci.*, 193:149, 1937.

DIAGNOSIS AND TREATMENT OF HEMORRHAGIC DIATHESIS*

CHARLES H. WATKINS, M.D.
Rochester, Minnesota

IN SPITE of the alarming picture that a patient with an acute hemorrhagic disease presents, a diagnosis of the type of hemorrhagic diathesis is generally not difficult to establish. There are four general types of blood conditions in which hemorrhage may play an important rôle.

Hemophilia

Hemophilia is usually readily diagnosed by the characteristic family history of hemorrhagic tendency confined to the male and transmitted by the female members of the family, by a history of frequent articular hemorrhages, prolonged hemorrhage from minor lacerations or following minor surgical procedures, as dental extraction and tonsillectomy, and by absence of petechial hemorrhage.

The laboratory finding that is most characteristic is prolongation of the clotting time of the venous blood. The prothrombin time is generally abnormally lengthened whereas the thrombocyte count is usually normal or slightly elevated, the bleeding time is within normal limits or slightly prolonged and the clot retracts if a

clot is eventually formed. Examination of a stained blood smear shows no diagnostic change; there may be a secondary type of anemia, with increased regeneration of erythrocytes, and in cases of severe hemorrhage some immaturity of the myeloid cells may be present.

The literature contains reports of conditions similar to, if not identical with, hemophilia which affected females. There is usually a familial tendency toward hemorrhage and the laboratory findings are those associated with a true hemophilia and in addition there is usually a slight to moderate decrease in the thrombocyte count. In most of these cases there has been no evidence of male hemophilia. Most authors regard this condition as female hemophilia, but do not feel that this disease is the same as male hemophilia.

Pseudohemophilia has been recognized for many years and more recently has been seen with increasing frequency. The condition affects both males and females and may be transmitted by either sex directly to sons and daughters. The features are recurrent hemorrhages from mucous membranes, uterus or gastro-intestinal tract. Hemorrhage may be mild or severe; it occasionally may prove fatal but usually de-

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creases with advancing age. Purpura is not common. Laboratory findings consist of prolonged bleeding time, normal coagulating time and normal or high thrombocyte count. The prothrombin time and clot retraction time are usually normal but they may be prolonged and may vary considerably in the same case from time to time. It is probable that many cases grouped under this heading can be more definitely placed under specific types of blood dyscrasias with future research and greater understanding of the details of the mechanism of blood coagulation.

The treatment of hemophilia is often most discouraging. At present, transfusion offers the most encouragement in all cases of serious or moderately serious hemorrhage. Local application of coagulating snake venom (that of the fer-de-lance or of Russell's viper) is of some value in control of localized hemorrhage, particularly application to the tooth socket after the extraction of a tooth or when the venom is applied directly to the bleeding lesion. In 1936, Timperley, Naish and Clark, by the use of an extract of egg white, were able to reduce the coagulation time and control hemorrhage in cases of hemophilia when the material was given intramuscularly or intravenously. They emphasized that this substance is not a cure for hemophilia as it merely controls hemorrhage and repeated injections of adequate amounts are required to do this.

"Sango-stop," which consists principally of pectin, had been used with some success in the control of hemorrhage by Gohrbandt. The material may be used locally or given intramuscularly. In my experience this material had no apparent effect in controlling the hemorrhage during an acute exacerbation in two cases of hemophilia.

Patek and Taylor observed that cell-free normal plasma contained a substance which shortened the coagulation time of the blood in hemophilia. They have precipitated a globulin from normal plasma which, when suspended in saline solution, was as effective as whole plasma in reducing the coagulation time. This same effect could not be obtained by the equivalent material from hemophilia plasma.

Steinberg and Brown reported reduction of coagulation time by intravenous injection of a

solution of oxalic acid into rabbits. Further work is necessary to establish the value of this procedure in the control of bleeding in hemorrhagic disease.

The use of various ovarian substances has not been proved of much clinical value although much investigative work has been and is still being carried out along this line. There is, however, evidence that a placental extract may produce a reduction in the coagulation time. It is hoped that in the near future, as more research is carried out, some of these substances will become available, but at present the most satisfactory and generally obtainable treatment is the local application of coagulating snake venom and repeated transfusion of blood.

Acute Leukemia

The chief problem confronting the physician who sees a patient with rapidly progressing anemia, weakness, fever and hemorrhagic phenomena is the diagnosis, since acute leukemia, aplastic anemia and thrombocytopenic purpura present similar features. An elevated leukocyte count is not always essential to the diagnosis of leukemia; in approximately 45 per cent of the cases of acute leukemia seen at The Mayo Clinic from 1929 to 1933, inclusive, the leukocyte counts were less than 10,000 per cubic millimeter.⁷ It is the qualitative rather than the quantitative picture of the leukocytes that is important. Morphologically the diagnosis is made by the finding of a large number of immature leukocytes with a high proportion of stem cells in stained films of the blood. On the basis of morphologic character of these cells, leukemia may be divided into myelogenous, lymphatic, monocytic, and reticulo-endothelial types. Acute monocytic leukemia may be subdivided into two types. In one, the Schilling type, transitions from reticulo-endothelial cells to monocytes may be distinguished; in the other, the Naegeli type, intermediate stages between monocytes and myeloblasts may be seen. The former may be regarded as a variant of reticulo-endotheliosis and the latter a variant of myelogenous leukemia. In acute leukemic reticulo-endotheliosis, cells of reticulo-endothelial origin, which are more primitive than stem cells, are observed in the circulating blood, and intermediate stages between these and mature lym-

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phocytes are found. These differentiations are of considerable academic interest but are of secondary clinical importance. Acute leukemia is characterized by ulceration of the mucous membranes, fever, anemia, and usually enlargement of the liver and spleen. Usually hemorrhagic phenomena occur late. The anemia, which is an invariable accompaniment of acute leukemia, usually is normocytic and normochromic except in the late stages of the disease when hypochromasia and signs of increased regeneration of erythrocytes are the rule. Since the platelets are usually reduced in number, bleeding time is prolonged, clot retraction is delayed or absent and coagulation is normal, prolonged, or may not occur. Petechial hemorrhages are common; articular hemorrhages are very rare.

Treatment of acute leukemia is, at best, palliative and consists principally in the administration of transfusions. Exposure to roentgen rays and radium is contraindicated for this usually aggravates the anemia and hemorrhagic features and may cause more marked immaturity of the leukocytes and more infiltration of the bone marrow and other hematopoietic organs.

Aplastic Anemia

This is a disease of unknown cause which is characterized by progressive anemia, leukopenia, absolute decrease in myeloid leukocytes, and thrombocytopenia. It progresses to a fatal termination in a few weeks in the acute form, while in the chronic form the patient may survive for months or even one or two years. The disease occurs mainly among young adults and affects females more frequently than males. The symptoms at first are mainly those of anemia. Later, as the granulocytes disappear from the blood stream, infections are common and when the blood platelet count falls to low levels, hemorrhages occur. The spleen is not palpable. The late appearance of hemorrhage and the absence of a palpable spleen point strongly to aplastic anemia. Examination of the blood smears fails to show signs of normal regeneration of erythrocytes and the reticulated erythrocyte counts are usually low but may in some cases be slightly increased. In cases in which the diagnosis is questionable, study of the bone marrow may be of value. In most cases these studies show atrophy of the hematopoietic re-

gions and their replacement with fatty and gelatinous connective tissue. Rarely hypoplasia of the red marrow may be found and in such cases it is assumed that the end states of cellular maturation have been arrested and that immature cells are not being released into the circulation.

There is no specific treatment for aplastic anemia. Blood transfusions are only of temporary benefit but they may considerably prolong life.

Purpura Hemorrhagica

Purpura hemorrhagica, or essential thrombocytopenia, is a disease characterized by hemorrhagic phenomena and by a marked reduction of the number of platelets in the circulating blood. Two main hypotheses have been presented as to the possible mechanism of the reduction of platelets: (1) increased rate in the destruction of platelets in the spleen, and (2) a depressing effect by the spleen on the formation of platelets. The latter hypothesis has received added support in the recent experimental observations that have demonstrated the presence of a substance in the spleens of persons who had thrombocytopenic purpura. This substance, when injected into rabbits, caused marked reduction of the number of blood platelets in the peripheral blood.

Purpura hemorrhagica mainly affects children and young adults, but the patients may be of any age. The disease may be either acute or chronic; the latter is the more common type.

The chronic form of the disease is characterized by cyclic periods of hemorrhage and spontaneous remissions, in the course of which there is complete freedom from symptoms. These hemorrhagic phenomena may be minor and practically confined to a few petechiae; they may thus escape notice until more marked symptoms of hemorrhage occur. Usually, in time, these cyclic periods of hemorrhage become more frequent and the hemorrhage becomes more severe than before, so that the disease may be regarded as acute when really the condition at hand is an acute exacerbation of a chronic condition. This cyclic tendency is so characteristic that it is a valuable aid in arriving at the correct diagnosis; the tendency is not present in aplastic anemia or acute leukemia, which present labora-

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tory findings similar to those of hemorrhagic purpura. The acute form usually is rapid in onset and is characterized by severe hemorrhagic phenomena, but the essential factor in differential diagnosis is that hemorrhage is the first sign and is not preceded by anemia.

The laboratory findings of diagnostic significance in hemorrhagic purpura are as follows: Bleeding time is prolonged and the platelet count is reduced to 50,000 per cubic millimeter of blood or less. Retraction of the clot is delayed or absent. Coagulation time of the venous blood usually is normal but may be slightly prolonged. The number of leukocytes is normal or increased. Examination of blood smears reveals a marked decrease in, or absence of, blood platelets. Also, there is evidence of increased regeneration of erythrocytes, as is evidenced by polychromatophilia and anisocytosis; these phenomena are attributable to demand on the bone marrow following loss of blood. Rarely is there any evidence of immaturity of the myeloid leukocytes unless the hemorrhage has been so severe as to produce a leukemoid reaction. Stem cells (myeloblasts) are rarely found.

Recent studies of bone marrow obtained by sternal aspiration in cases of thrombocytopenic purpura have shown a megakaryocytic hyperplasia. According to Limarzi and Schleicher, many immature megakaryocytes are present. In the acute phase the promegakaryocytes predominate and in the more chronic forms the mature megakaryocytes are in the greater proportion. In the presence of acute hemorrhage in cases of essential thrombocytopenic purpura there is a uniform hyperplasia of the bone marrow in addition to the megakaryocytic hyperplasia, while in cases in which the disease is chronic and associated with but slight hemorrhage the myeloid and erythroid hyperplasia may be absent but the megakaryocyte hyperplasia remains. Following splenectomy the bone marrow returns to normal. They concluded that essential thrombocytopenic purpura is due to faulty maturation of megakaryocytes and that splenectomy removes a factor which inhibits this maturation.

The most feared complication of this disease is cerebral hemorrhage, which frequently occurs in association with the acute form or with an acute exacerbation of the chronic form. It

is often terminal and its appearance is always ominous.

Numerous other purpuric phenomena may be confused with essential thrombocytopenic purpura. The so-called allergic type of purpura is similar to hemorrhagic purpura but usually there is a definite history leading to identification of the precipitating allergic factor and the condition reappears when the patient again is exposed to this factor. Some chemical substances, particularly those that have a tendency to damage the bone marrow, such as arsenic and its derivatives, benzol, mesothorium and trinitrotoluene, may cause purpura. Rarely certain sedative and analgesic preparations give rise to the condition and exposure to extremely short roentgen rays and to radium rays may produce a picture similar to that of hemorrhagic purpura. Care in taking of the history is of great importance in eliminating these many causative factors.

There are two purpuric conditions that are not well understood but which must be considered in differential diagnosis. In Henoch's purpura, hemorrhage occurs most commonly in the intestinal tract and is associated with abdominal pain. Purpura rheumatica, or Schönlein's disease, is a similar condition in which the hemorrhage is likely to occur in the joints. The bleeding time, number of blood platelets, and other laboratory findings are practically always within normal limits in these two conditions. It is thought that these diseases are produced by an allergic mechanism.

Other confusing conditions may be dealt with briefly. Acute infectious disease sometimes produces purpura without much demonstrable change in the coagulation mechanism of the blood. This type of purpura is usually the result of injury to the walls of the capillaries. Certain deficiency diseases, such as scurvy, are characterized by purpuric manifestations, and these, likewise, may be terminal complications in many debilitating diseases. Occasionally, in a case of very severe pernicious anemia, the bone marrow may become so deficient that the number of blood platelets is sufficiently reduced to produce purpuric manifestations. The diagnosis of this condition usually is readily made and the patient rapidly improves under adequate treatment for pernicious anemia.

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Many treatments for hemorrhagic purpura have been suggested but, at present, splenectomy is in favor. Splenectomy should be performed, if possible, in the period of remission of the chronic form of the disease or as early as possible in the presence either of the acute form or of an acute exacerbation of the chronic form. The risk is much increased during a period of severe hemorrhage, particularly in the acute phase of the chronic recurrent type, but if the patient is not extremely anemic the risk is less than that of allowing the disease to progress.

Giffin has classified cases of thrombocytopenic purpura as incipient and recurrent and has discussed the indications for therapy in the acute phases of each type. The recurrent type seen in the course of an acute exacerbation is most hazardous and every opportunity should be given by medical treatment to induce some indication of remission before splenectomy. In some cases, transfusion of blood may result in temporary cessation of bleeding so that splenectomy can be performed with reduced risk. In most cases, splenectomy results in cure but in certain cases, after operation, bleeding continues to a fatal termination. Since this occurs rarely it is

not to be regarded as a contraindication to splenectomy but is simply a risk that must be taken.

In cases in which the disease is mild and incipient, transfusions of blood often will control the hemorrhagic tendency. Moccasin venom is said to be of value in certain of the milder forms of the disease. Large doses of vitamin C also have been used with some success. These substances are worthy of trial but one should not temporize too long if there is no evidence of improvement, and splenectomy should be performed, if possible, before a fulminating, acute stage has been reached.

References

1. Giffin, H. Z.: Problems associated with the treatment of essential thrombocytopenic purpura: notes on forty-four cases in which splenectomy was performed. *Trans. Assn. Amer. Physicians*, 47:218-227, 1932.
2. Gohrbandt, Erwin: Die Einwirkung der Pektine auf die Blutgerinnung. *Deutsche med. Wochenschr.*, 2:1625-1629, (Oct. 2) 1936.
3. Limarzi, L. R., and Schleicher, Emil: Unpublished data.
4. Patek, A. J., Jr., and Taylor, F. H. L.: Hemophilia. II. Some properties of a substance obtained from normal human plasma effective in accelerating the coagulation of hemophilic blood. *Jour. Clin. Investigation*, 16:113-124, (Jan.) 1937.
5. Steinberg, Arthur, and Brown, W. R.: Unpublished data.
6. Timperley, W. A., Naish, A. E., and Clark, G. A.: A new method of treatment in hemophilia. *Lancet*, 2:1142-1149, (Nov. 14) 1936.
7. Watkins, C. H.: Acute leukopenic leukemia and its differential diagnosis. *Wisconsin Med. Jour.*, 32:156-160, (Mar.) 1933.

RECURRENT THYROTOXICOSIS AFTER THYROIDECTOMY*

O. J. HAGEN, B.S., A.M., M.D. F.A.C.S.

Moorhead, Minnesota

VITAL to the discussion of recurrences of thyrotoxicosis following thyroidectomy is an understanding of the causal factors of toxic goiter. And this matter of causal factors plunges the discussant immediately into the vortex of differing opinions. After three decades of research and debate, the proponents are not in agreement. So at this date, we are forced to admit that no one really knows the etiology of the toxic goiter, commonly known as Graves' disease.

Meanwhile, for the purposes of discussing the subject, I am forced to set up a series of postulates.

Postulate 1.—What has come to be termed the Graves' constitution is predisposing to the production of the thyrotoxic state.

Biologists hold that the role of heredity plays no small part in shaping individual destiny. In medicine, one conversant with the nature of disease is struck by the fact of predisposition. There is the potential diabetic, the tuberculous, the rheumatic, the vascular, and the insane. The problem of thyrotoxicity, initial or recurrent, is wrapped up in something more than the histopathology of hyperplasia present in the thyroid. Boyd¹ is responsible for the unqualified assertion that there may be hyperplasia with or without hyperthyroidism. He states further: "Marine showed long ago that when a large part of the thyroid was removed, the remaining portion showed a picture identical with that of Graves' disease, and yet the animal showed no evidence of hyperplasia. Both in animals and man, hyperplasia may be present without any symptoms of

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hyperthyroidism. In Graves' disease the hyperplasia may disappear and the gland revert to a colloid condition, and yet symptoms of hyperthyroidism may persist."

These facts justify one in looking elsewhere than within the thyroid gland alone. Henry Plummer's theory—the hurried overproduction in the gland of an active agent, abnormal in quantity and quality—cannot, however, I believe, be wholly refuted.

In general, to solve the problem, I feel that one must search the deeps of the subconscious where brood the emotions, the obsessions, and the desires of man, and search the endocrines, which correlate and regulate his life. Certain it is, too, that the thyrotoxic patient is abnormally sensitized to psychic traumas, to infections, to severe physical and mental strains, which tend to heightened cerebration, autonomic and emotional instability, to an abnormally excitable heart, vasometer ataxia, a lowered threshold of emotional reaction. Obviously such a state will leave him in all the varying stages of physical, mental, and psychic demoralization according as one or many of these forces assail him. The Graves' constitution is a corporeal and incorporeal entity so unconditioned as to render its possessor quite incapable of reacting normally and efficiently to life's more violent impacts. He cannot "take it" as the saying runs. And so these individuals represent a strain among humans, allergic, so to speak, to the forces that play upon them, tending to overwhelm and disorganize them. These same forces playing upon the basically fit only tend to develop them the more for mastery over themselves and their surroundings. (The impacts only tend to their survival.) The Graves' constitution is therefore a vicious heritage. It is largely a man-made predisposition. Those possessing it are victims born out of a highly sensitized stock—a stock made so by a cruel world. When one studies the struggles of the race, from cave man to the man of today, his struggles through the ages against famine and pestilence, his wars, his iniquities, it is but natural that in many these impacts would leave telling taints and scars. Nor is it strange that in turn the progeny of these would bear the marks of inferiority and that for many, the trials, the disappointments, the outright frustrations, the black despairs would result in an inability to cope

with the perplexities of a world beset with troubles.

Imagine a severely affected thyrotoxic patient sitting here before us. She comes for restitution at our hands. Look at her. As mute testimony of the fires that rage within, we find her a trembling, high-tensioned creature so distracted as to carry tears in her eyes; her palpebral margins are spread; her eyes look at you with a stare—the very embodiment of the emotion of fear; one or both eyes bulge, presenting the picture known as exophthalmos; the blood vessels of the neck stand out, throbbing almost to audibility; the bared chest reveals a ribbed, palpitating exterior against which barrier a throbbing engine beats; the whole body trembles from head to foot with fine constant tremors in the tongue and fingers; the skin is moist and hot. Where in any other disease do we find a body so rocked by forces from within and one so sensitive to forces from without? You and I are confronted with such a patient not infrequently and we are expected to make her whole.

We know that infections which others could cope with often overwhelm her. Salpingitis, influenza, a simple tonsillitis often touch off the trigger. The normal physiological strains incident to frequent pregnancies, abortion, and the sexual relation cut down her nervous and physical reserve levels, leaving her a quivering wreck. She tries to meet her obligations to her husband, to her children, and to her society, conditioned nervously with only exhausted batteries. She feels her inadequacy. She becomes distracted, panicky. Life's frictions are fast defeating her in the unequal contest. To meet the situation there is within a frantic effort towards equilibrium, but the whole endocrine system gets out of balance; and this already neuro-endocrine imbalance is responsible for practically all the racking evidences expressed—the rapid loss of weight, the sweating, the stare, the nervousness, tachycardia and exophthalmos. As evidence of the imbalance of the whole neuro-endocrine system, one needs only to cite that the gonadal cells in these patients act fitfully, for at one stage there is menorrhagia, then amenorrhea and sterility; the hypertension and tachycardia indict the adrenals; the tremors and the calcium aberration, the parathyroids; the sweating, the sympathetic system; the elevated blood sugar,

RECURRENT THYROTOXICOSIS—HAGEN

the pancreas; the higher icteric index, the liver, etc. It seems as if all of the vital centers have united in a pernicious conspiracy to wreck the victim.

Postulate 2.—Given a Graves' constitution, the varying factors described are responsible for the constitutional symptoms characteristic of the disease. The evidences lie in the evaluation of the tangible and intangible data just presented.

Postulate 3.—The thyroid gland is the victim of circumstance rather than the arch gangster in the conspiracy. (The thyroid has been made the goat.) In this contention, the discussant has the support of some of the greatest students of the subject. They voice reservations in indicting the gland as the Capone of the gang. Many of the worst gunmen are believed to be secreted in hide-outs in the deep interiors of the body; some are walking at large, suspected, in the form of husbands, brothers, sisters, mothers-in-law, neighbors, teachers, preachers; some of them are not even in human form but exist in the atmosphere that surrounds their lives, among which may be named the social unrest, strikes, the automobile, the uneconomic order, unemployment, war, and rumors of war that would rob the home of husband or son, marital maladjustment, jealousy, unrequited love, fear of everything and everybody—even of themselves. That the thyroid is a target shot through with poisoned shafts from within, of that there can be no question. That iodine imbalance in the blood results is not disputed. That in some way the thyroid has much to do with Graves' disease is proven by the fact that its removal will cure the patient in an overwhelmingly high percentage of cases. But, that even its complete removal will in many instances fail to effect a cure or prevent recurrences supports the view that the thyroid acts as transmitter. If the voltage from the high potentials within is great enough it will spill over to continue the depredation. One knows from the physics of electricity that if the air be surcharged from a high frequency, high tensioned transformer, electric bulbs lying near and about may glow. Pemberton's² remarks are revealing when he states: "In some manner thyroidectomy breaks an important link in the unknown chain of etiologic factors."

Really to reduce the percentage of continuing

and recurrent thyrotoxicosis, three concurrent procedures are essential:

1. A careful evaluation of the patient's heredity and his environmental impacts, for not to understand and attempt to control them is to increase the number of recurrences.

2. A full evaluation of the damaged organism as well as the personality must be made that rehabilitation may be effectively inaugurated. The restoration of the thyrotoxic patient requires something more than the mere routine of rest. Lugol's, sedation, vitamin B and C, etc. These are important, maybe vital, but they are with the exception of B and C merely transient accessories to the final conquest of this malevolent disease.

3. A successful operative procedure, subtotal thyroidectomy, is considered the best single method to effect a cure.

The fact is that somehow occasionally an exophthalmic goiter patient does get well without any treatment. Somehow the termites cease their depredations and the system becomes again normally regulated. I have seen the return of a lover clear up one girl's hyperthyroidism.

X-ray will sometimes effect a cure. But let us remember that the x-ray tube cannot discriminate between thyroid and parathyroid; only a trained radiologist can do that. I have seen irreparable damage done through an unwise use of this agency.

It is important that in the surgical attack one must have precise knowledge of the local anatomy, be meticulous in his dissection, and be fully prepared to meet the emergencies that may arise in the procedure. Pemberton has well stated the reasons for the necessity of such resourcefulness to avoid catastrophes—catastrophes that will not only bring irreparable injury to the patient but also a haunting embarrassment to the surgeon. He says: "Certainly today an operative procedure cannot be termed successful, no matter how effectual has been the relief from symptoms of the disease, if a high proportion of injuries to nerves and even the occasional occurrence of severe tetany is the price."

The mortality rate incident to the surgery of the thyrotoxic patient in the hands of the more experienced surgeon has been reduced to that existent in an uncomplicated appendectomy.

RECURRENT THYROTOXICOSIS—HAGEN

Such expert surgeons as Crile, Lahey, Pember-ton, Dixon, Nordland, and Arnold Schwyzer hold it down to from 0.5 per cent to 0.8 per cent. Among the occasional operators the mortality rate still rests between 13 per cent and 18 per cent, the main reasons being inexperience, inability to evaluate the patient, inadequate preparation, ill-timed dating of operation. Any one of these factors may be responsible for the deaths. The matter of survival is of primal importance to the patient. There is no danger of a recurrence among the dead. But among those that survive there is the constant threat of continuance or recurrence of the thyrotoxic syndrome unless the rules of the great game are observed.

Thompson, Morris and Thompson³ published a comprehensive review of the subject of recurrences, revealing that among the different series in literature the incidence ranged from 0.25 per cent to 25 per cent. In their own group of 190 patients followed from three months to six years after operation, thirty-seven (20 per cent) had either persistent or recurrent thyrotoxicosis.

These authors pointed out that the frequency with which this condition is encountered will depend in some measure on how carefully the patients are followed and how generously their postoperative course is interpreted. Of their thirty-seven patients with persistent thyrotoxicosis twenty-six were considered "much improved" by operation.

Obviously, the statistics of "recurrence" depend as stated "on how generously or critically their postoperative course is followed." In April last I performed a thyroidectomy on a patient who had been operated elsewhere for thyrotoxicosis eighteen years before—a recurrence. Another patient who had had her thyroid operated upon previously came to see a colleague a week ago for a heart disturbance. I was called in to say "hello", only to find that I had operated on her fifteen years before for toxic goiter and now she is suffering from a recurrence. Both of these patients were classified as cured. So one must conclude that the statistics on recurrences are not reliable.

In a series of 500 patients with toxic goiter operated upon by me at St. Luke's and the U. S. Veterans' Hospitals in Fargo, North Dakota, with a mortality of .8 per cent, I find after a casual survey that I must place the percentage

of continuance and recurrences at about 20 per cent; that is, if I am to compare these patients' instability with normal individuals.

The recurrences twenty-five years ago may have been fewer. But then the mortality rate stood at 25 per cent and above. Then, too, the times were different. These last twenty years have been years that have tended to break both body and spirit. The World War and its sordid aftermath, the last nine years filled with depressions and recessions, with worries and fears without numbers, have taken their toll in the form of recurrences. Statistics mirror conditions, and obviously they vary for different generations. One operates to cure, but if the patient is sent back into the same hell that produced the disease originally, it is not strange that many return with the symptoms. You cure a peptic ulcer, but if the patient goes home and lives again the same life that produced the ulcer in the first place, he will return with a recurrent peptic ulcer even if you have removed the original one surgically.

Conclusions

1. The Graves' constitution is a predisposing cause of thyrotoxicosis and its recurrence after operation.
2. The more active forces tending to initiate the state are corporeal and incorporeal and may be designated as infections, psychic traumas, etc., playing upon a sensitized mechanism.
3. There is present an imbalance in the endocrine system that tends to disrupt normal function. To restore the patient, correct the imbalance.
4. The thyroid gland is participant in the vicious corporeal circle, and in some way its partial removal will sometimes completely cure and often largely ameliorate the symptoms of Graves' disease.
5. Recurrences are best prevented by a careful appraisal of the patient, by a liberal tub-total thyroidectomy, and by a carefully planned "follow-up" that will eliminate the factors responsible for the initiation of the disease.

References

1. Boyd, William, *Surgical Pathology*. Third edition, 1936. Pages 213-215.
2. Pemberton, John de J.: Recurring exophthalmic goiter. *Jour. Am. Med. Assn.*, 94:1483, (May 10) 1930.
3. Thompson, W. O., Morris, A. E., and Thompson, P. K.: Thyrotoxicosis following subtotal thyroidectomy for exophthalmic goiter. *Arch. Int. Med.*, 46:946, (Dec.) 1930.

PELVIC PAIN*

W. A. COVENTRY, M.D.
Duluth, Minnesota

THIS rather broad subject lends itself to a very lengthy discussion of all causes of pain in the pelvis. A discussion of all its causes would lead to so much confusion that I shall limit myself briefly to some of the more common pains in this region.

Dysmenorrhea, a most common complaint, still taxes the ingenuity and skill of medicine. I like to think of a classification for this complaint as falling into three general types: (a) premenstrual, (b) menstrual, (c) postmenstrual.

The premenstrual type is probably influenced by a patient with a fundamentally low threshold to pain. One may well ask if there is in addition a spasm of uterine muscle, an obstruction of the cervical canal, a hypersensitivity of the presacral plexus, a hormonal disturbance, an endometriosis, or that rather large classification of "what have you." We may also ask ourselves in determining the cause if we can hope to alleviate the pain. Nowhere in our gynecological studies are we more taxed in finding the fundamental cause than in the large majority of cases of dysmenorrhea.

In endometriosis we may find increased thickening in the cul-de-sac which should arouse our suspicion of such a condition being present, but if the endometriosis should be of the utero-muscular type or the endometrial cells have implanted themselves elsewhere in the abdominal cavity, then our diagnostic ability is indeed taxed to the limit.

The hormone approach of dysmenorrhea has been one of the more recent theories advanced, but empirical treatment with hormones has not yielded sufficient relief to warrant the assumption that the hormones are a causative factor. There is, perhaps, much more to be learned regarding this theory.

The theory of muscular spasm induced by a tight cervical canal is old and still has many advocates for dilatation of the cervix for the relief of premenstrual pain. Often, temporary relief

is obtained. This theory is also borne out in the results we have often seen, when dysmenorrhea disappears after the first baby is born.

The theory of resection of the presacral nerves for the relief of pain has been prominent in the literature in recent years. This plan has found but few advocates as failure to obtain results has been the rule and cures so few. May I warn you not to be in a hurry to perform this type of operation. Extreme care must be exercised in evaluating the case in which resection of presacral nerves is warranted and surely no promise should be made as to results. When you have exhausted all other causes of menstrual pain or, as you might say, "The Last Hope," you may advise presacral operation, but remember you are doing a major operation and it is difficult to do it thoroughly and properly.

Anodynes and antispasmodics may and must be tried, but in addition to bowel regulation and general health measures; adequate rest is most important.

The menstrual type of dysmenorrhea is usually due to malposition of the uterus, especially when accompanied by pelvic adhesions binding down a retroverted uterus. Replacement of the uterus if possible and insertion of a suitable pessary will rule out pain due to malposition.

The postmenstrual type usually is due to infection, acute or chronic, of the adnexa or uterus. Surgical intervention offers the best assurance of relief.

Aside from dysmenorrhea, other more common causes of pelvic pain are ovarian disorders. Chronic pelvic inflammation with adhesions frequently causes pelvic pain when the Graffian follicle ruptures. This pain may be of a dull dragging character but often is very acute, and severe, and may be mistaken for acute appendicitis. Indeed it is not an uncommon error to operate for acute appendicitis and be surprised to find a ruptured corpus luteum cyst. The proper diagnosis requires a most careful evaluation of the history obtained.

*From the Duluth Clinic, Duluth, Minnesota. Read before the Minnesota State Medical Association meeting in Minneapolis, June 1, 1939.

PELVIC PAIN—COVENTRY

Torsion of an ovarian cyst does cause severe pelvic pain and often is difficult to diagnose, especially if the pedicle be a long one.

In acute salpingitis the pain is severe, while in the chronic variety it is more dull, dragging or bearing down in character. Extra-uterine pregnancy causes a dull pain until rupture occurs, when the pain will become more acute.

Under the classification of infections one must not forget that endocervicitis and cervical erosions are a common cause of pelvic pain. This pain is accentuated by lifting up the cervix and thus putting the sacro-uterine ligaments on a stretch. Fortunately, this condition is easily cured by cauterization of the cervix and elimination of the infection present. Acute appendicitis, when the appendix is low down in the cul-de-sac, is an interesting cause of acute pelvic pain.

Carcinoma of the uterus, cervix, or ovaries causes no pain until it invades the parametrium or involves by metastasis the pelvic bones, when the pain may become almost unbearable. The constant encroachment of the growth confined within bony walls is unbearable, and relief can only be afforded by morphine, deep x-ray therapy, or alcohol injection of the spinal nerves. Metastasis of carcinoma from other parts of the

body, especially the breasts, invading the pelvic bones, may cause most severe pain. Metastatic cancer from the intestine or stomach, the migrating cells lodging in the cul-de-sac and producing the so-called carcinoma shelf, is a most deceptive cause of pelvic pain and a growth in this region should cause enough suspicion to warrant thorough search for the original site of the malignant growth.

The psychic factor must always be considered when attempting to evaluate the amount and the character of pelvic pain. The threshold for pain in many neurotic individuals is exceedingly low. It is important to study the patient's reactions psychologically and thus be able to determine with some degree of accuracy the severity of her pain.

Thus, we may observe that pelvic pain may be due to many causes, some very simple to diagnose and treat, and some most difficult, requiring painstaking efforts after working by a process of elimination to arrive at the cause of the pain. Even then, one is occasionally unsuccessful, especially when endometriosis is the cause, but more often in those cases where the psychic cause is most difficult to diagnose and still more difficult to treat.

GREATER USE OF SURGERY IN TUBERCULOSIS RESULTS IN CHANGES IN THE HOSPITAL

Probably the most significant and far-reaching change which has come about in the tuberculosis hospital field is the trend toward surgical treatment of the disease. This has involved changes in design and equipment of the hospital, in the organization of the staff, in provision for nursing of surgical cases and development of closer relations with general hospitals. Wherever the tuberculosis hospital is not prepared to meet the demand for better operating rooms, laboratories and x-ray equipment, the facilities of the general hospital must be utilized.—Hospital Management, Sept., 1939.

LUPUS AND PULMONARY TUBERCULOSIS

Lupus patients rarely die of lupus according to the conclusion drawn from a study of 211 patients who died after attending the skin department of the Finsen Institute of Copenhagen in the last 25 years. While lupus seldom proves fatal, other manifestations of tuberculosis, particularly pulmonary tuberculosis, are a frequent cause of death. In many fatal cases of pulmonary tuberculosis the disease of the lungs become manifest shortly after treatment of the lupus had been instituted. If the lupus patient can avoid death from tuberculosis he has a good chance of living to a ripe old age.—GUDTOFT, C.N.S., Jour. Amer. Med. Assn., Sept., 1939.

HISTORY OF MEDICINE IN MINNESOTA

HISTORY OF MEDICINE IN HENNEPIN COUNTY

BY A. S. HAMILTON, M.D.

(Continued from November issue)

In July of this year Dr. L. Bristodeau began practice opposite Francis Huot's house on Main Street, Saint Anthony. He went to Dayton.

A column of short notes in the *Minnesota Republican* of 1854, a short-lived paper, has the following facetious items:

"Dr. Johnson will cure your eyes. Dr. Fell will fill or extract your teeth. Dr. Anderson will attend to your system generally."

In October, 1854, Drs. A. R. Lincoln and C. W. Le Le Boutellier were added to the list of practicing physicians.

January 23, 1855, saw the opening of the Mississippi suspension bridge, which crossed the river at about the site of the present Hennepin Avenue bridge, and Dr. J. H. Murphy was marshall of the day. The *Express* says of the event:

"To the private citizens of Saint Anthony and the County of Hennepin belongs the credit, we should say the honor, and glory, of constructing the first bridge that ever carried a living being across the great river of the North American continent."

Dr. Murphy was one of the six members who urged its building, and, in spite of opposition, carried it to a successful issue.

In 1855 the *Saint Anthony Express* begins to warm up a bit toward the doctors. Probably the editorial baby had been ill, and, in September, after informing us that Dr. Leonard is putting up his own gravel house and henceforth it will no longer be an experiment that gravel houses (they are stucco now) can be erected at half the cost of other material, it goes on to say this:

"The Doctor merits success not only in the matter of gravel wall, but in his profession. He has but lately come among us but has already added to a reputation that before was spotless."

Doubtless the *Express* meant well, but why should they spot a "spotless" reputation!

In October, 1855, there was published in the *Express* a history and business directory of Saint Anthony in which was included the following list of physicians:

Saint Anthony

Dr. J. H. Murphy, Main Street, established 1850. He was the third physician in Minnesota.

Dr. A. E. Johnson, established 1853.

Dr. C. W. Le Boutellier, established 1854.

Dr. Z. Jodon, Second Street, established 1853.

Dr. J. A. White, Main Street, established 1853.

Minneapolis

Dr. A. E. Ames, Fifth Street, established 1852.

Dr. C. L. Anderson, Second Street, established 1855.

Drs. Leonard and Wheelock, Hennepin Avenue, 1855.

Dr. Rouse, 1855.

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In December of this year Dr. Wheelock moved to Clearwater.

Dr. Rouse has not been previously mentioned. He became quite prominent in Civil War days and served as assistant surgeon of the 8th Regiment of Minnesota Infantry, from September 12, 1862, to July 11, 1865, but we have no earlier information in regard to him. An account of Le Boutellier will be given later.

Medical Methods

There is not much on which to base an opinion concerning current medical procedure. In the *Minneapolis Gazette* of February, 1855, Dr. Greeley offers a choice of operations performed with or without chloroform or ether. There is repeated reference to treatment by physiotherapy and botanical methods and much was made of the virtue of the pine-laden atmosphere of Minnesota, especially for the cure of tuberculosis.

On April 7, 1860, Dr. Sabine, who was leaving the Falls for Anoka, states that there were in Minneapolis and Saint Anthony sixteen or eighteen practicing physicians of various schools, and these in a community where the average annual mortality was a small fraction of one per cent. And the editor adds that they were equally well supplied with druggists, and the same edition reports that Dr. Leonard has gone into the drug business with a Mr. Gardner.

The *Tribune* of October 5, 1869, announces that typhoid fever is prevailing in many portions of the state, and that "This uncommon disease is probably attributable to the uncommonly cold and wet season."

HENNEPIN COUNTY MEDICAL SOCIETY

About the year 1889, the minutes of the society were lost or destroyed and, at the present time, accurate records of the transactions of the Hennepin County Medical Society exist only since July, 1897. In 1870 the founder and first president, Dr. A. E. Ames, read a paper giving a short account of the members of the society who had died or removed from Hennepin County since the society's organization, and this paper was preserved in the *Northwestern Medical and Surgical Journal* for August, 1870; unfortunately, Dr. Ames said nothing of the organization of the society other than the date—nothing of its early activity or of the medical conditions in the early years of Minneapolis. In 1901 Dr. Edwin Phillips prepared and read a paper dealing with the early days of the Hennepin County Medical Society, and this paper was published in the *Northwestern Lancet* for September 15, 1901; and at the February, 1913, meeting of the society, Dr. James E. Moore read a paper entitled "Thirty Years' Experience in the Medical Profession in Minneapolis," which I think has not been published. Beyond these papers I have not been able to find any articles dealing with the development of medicine in this immediate district.

Under such circumstances, with no official records remaining and with no one then living who was connected with the early organization of the society, to say nothing of the uncertainty of memory of those who have second-hand information of our early activity, the preparation of a paper which I published in March and April of 1918 in the *Journal-Lancet*, on the early History of Medicine in Minneapolis, was no small task. In an attempt to secure the necessary information, begun about 1912, naturally my first thought was to refer to certain of our older members, now gone, but I early gave this up as an unsatisfactory source, for memory of what happened forty or fifty years ago is very uncertain, and the most of what is given herein has been derived from a careful reading

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of all the papers and directories published in Minneapolis in the early years, and of all the papers published anywhere in the very early history of Minnesota, supplemented by such information as I have been able to secure from a few of our pioneers still surviving. Fortunately, the earliest papers were not dailies, and were not so voluminous as those of the present time, but, even as matters stand, an immense amount of reading has been necessary, and, if my wife had not volunteered for the task, it would never have been done. I may add that to her is largely due the credit for gathering the material for this paper.

To state that as early as October 3, 1857, there were forty-five weekly and four daily papers in Minnesota, gives some idea of the amount of reading necessary, but items regarding doctors were scarce, and, when found, they often did not agree in details and dates with accounts given in other places by early writers, and even if accessible, they have been, in some instances, deleted and corrected, to a degree greatly impairing their authority, by later medical readers who evidently disagreed with the recorded matter.

Dr. Dunsmoor, in "Hudson's Half Century of Minneapolis," and the "Tribune City Directory" for 1873-1874 are authorities for the statement that the Union Medical Society (the precursor of the Hennepin County Medical Society) of Saint Anthony and Minneapolis, was organized in 1855 at the residence of Dr. A. E. Ames, who was elected president, with Dr. Wheelock, secretary. In at least two other places the date of organization of the society is given as 1856, but if there be any doubt on the subject it would seem to be removed by a statement of Dr. A. E. Ames in the *Northwestern Medical and Surgical Journal* of August, 1870, that the society was organized June 20, 1855. Neill's History gives the following account of the organization:

"The Union Medical Society was organized early in 1856 with Dr. A. E. Ames, president; Dr. C. L. Anderson, vice president; Dr. Wheelock, secretary, and Dr. C. W. LeBoutillier, treasurer. Amongst the old members were Drs. A. E. Ames, Anderson, Wheelock, LeBoutillier, Johnson, Leonard, Lowenburg, Ortman, White, and Dibb. On June 7, 1870, the Society reorganized as the Hennepin County Medical Society. The meetings are held the first and third Mondays at places designated before adjournment."

Neill's date is correct for the period of a re-organization (June 8, 1870), but the change of name to "Hennepin County Medical Society" was made in either March or April, 1869. (See later notes.)

The following account is from Dr. Edwin Phillips' article, already mentioned:

"The Hennepin County Medical Society was organized in 1856, a meeting for this purpose being held at the private residence of Dr. A. E. Ames, which was a small house situated between the old county jail and Ninth Avenue South. The house faced on Fourth Street, but stood far back in the yard so that it was nearer Fifth than Fourth Street. The founders and charter members of this Society were Drs. A. E. Ames, Chas. L. Anderson, Asa E. Johnson, A. Ortman, John H. Murphy, Wm. H. Leonard, C. W. LeBoutillier, Dr. Sewingburg (Lowenburg?), and Dr. Wheelock.

"Dr. A. E. Ames was elected the Society's first president, and Dr. Charles L. Anderson the first secretary. The Society adopted a program of essays, reports of cases, and discussions, much the same as the Society is working under today. Dr. Asa E. Johnson furnished the first essay read. The methods of carrying on the Society during its primitive years from 1856 to 1871, a period of fifteen years, were as follows: After the program of reading and discussing the papers was carried out the titles of the papers for the next meeting were announced, thus giving each member one month's time in which to prepare for the discussion of the papers for the next meeting, and the discussions were thorough and general.

"As the Society had no permanent place for meetings they were held in the offices or residences of members. When held at the residence of some member, his wife and daugh-

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ters usually invited the members after the meeting was adjourned to a luncheon of coffee, cake and sandwiches. * * * Some of the favorite places for holding meetings were at the residences of Dr. Wm. H. Leonard, Fifth Avenue North and Second Street, or Dr. John H. Murphy, on the corner of Sixth Street and University Avenue Southeast.

"During the Civil War the Society discontinued its meetings. In the fall of 1865 it was re-organized with Dr. A. E. Ames as president and Dr. Alfred Lindley as secretary. Dr. Ames went to California in the sixties, and during his absence Dr. Nathan B. Hill was elected president, and he held the office till Dr. Ames returned home, when he was again elected president and held the office until his death.

"It may be of interest for those here to know that the first president of our Society was a licensed attorney. He was admitted to the bar at the time when Judge Flandrau of Saint Paul was filling the office of county judge in Hennepin County.

"The Hon. Eugene Wilson moved to admit Dr. Ames to the bar. The doctor had at that time completed his new house, which is still standing at the corner of Fourth Street and Eighth Avenue South, opposite the old county court house. He decided to christen the new house by giving the legal fraternity a royal banquet in response to the honor conferred on him.

"The late John H. Murphy gave the Society its first banquet, some time in the sixties, in the small house on the corner of Sixth Street and University Avenue Southeast. Notwithstanding the fact that the house was small the banquet was immense, and consisted of an old-fashioned bill of fare from roast turkey and cranberry sauce down to the finest fruits of the season. The doctor having more than an ordinary stock of good common sense and a stock of jokes always on hand made this an event long to be remembered.
* * *

"Since the death of Dr. A. E. Ames, which occurred in 1875 (1874), the following named members of the Society held the office of president during the interval from 1875 to 1885:

"Drs. Nathan B. Hill, Calvin Goodrich, Alfred Lindley, D. M. Woodling, Charles Simpson, Edwin Phillips, O. J. Evans, Charles Wells, A. H. Salisbury, and J. W. Murray. The other members of the Society, not mentioned elsewhere, between 1865 and 1885, were Drs. C. C. Clark, Winthrop Miller, L. F. Damm, W. A. Hamilton, C. E. Rogers, Wm. Hutchinson, J. W. McDonald, C. Cockburn, G. F. Townsend, H. H. Kimball, Archibald Fairburn, J. L. Linn, Henry Keith, Richard Hill, H. S. Hubbard, Cyrus Smith, Charles S. McCollom, Robert S. McCurdy, J. H. Hammond, H. F. Latz, D. F. Collins, Mary Whetstone, A. S. Whetstone, Columbus Slagel, C. J. Spratt, J. H. Dunn, E. J. Brown, J. T. Moore, T. L. Laliberte, E. N. Sharp, W. A. Jones, and others whose names I cannot recall.

"In closing this report I cannot refrain from speaking particularly of some of the pioneer members who have died since 1871. Dr. A. E. Ames, the first president, was a rare presiding officer, cool, impartial, and conscientious. Dr. Calvin Goodrich was a smooth and ready debater and always took an active part in the discussions. Dr. Nathan B. Hill won the esteem of the Society by his thoughtful and argumentative manner in discussing medical topics. Dr. J. W. Murray was a close student, and always ready to take part in the discussions. Dr. Hamilton, although young in the profession, won for himself a high type of professional honor. Dr. John H. Murphy won for himself an honorable reputation as a general surgeon and practitioner. Dr. Winthrop Miller served the Society in a scholarly way by his essays and discussions. Drs. Clark and Salisbury served the Society long and faithfully as secretaries. Dr. L. F. Damm won for himself an honorable position in the Society as a chemical expert. Dr. A. Ortman, one of its charter members, was at all times conscientious, honest, truthful, and labored faithfully to elevate and build up professional character. Dr. D. F. Collins was a fine scholar, and added much to the literary work of the society. These gentlemen have written their last essay and made their last address, and have passed on to a bright and beautiful eternity."

The first mention of the Society found in any of the papers available is in the *State Atlas* of December 3, 1862, as follows:

"The Union Medical Society of St. Anthony and Minneapolis met on the twenty-first ultimo at the office of Dr. Ward in Minneapolis. The following officers were elected: A. E. Ames, President; R. H. Ward, Secretary; A. E. Johnson, Librarian; Drs. Johnson, Ward and Lowenberg, Committee of Medical Ethics; Drs. Leonard, LeBoutillier and Hill, Committee on Publications. Three new committees were appointed as follows: Drs.

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Ames, LeBoutillier and Johnson, Committee on Epidemic Diseases; Drs. Johnson, Leonard, Ortman and Hill, Committee on Diseases of Respiratory Organs; Drs. Ward, Lindley and Lowenberg, Committee on Chronic Diseases of Digestive System.

"On motion it was resolved: That as Drs. Murphy, LeBoutillier and Greeley, members of the society, are engaged in medical services in the Federal Army, they be and are hereby requested to correspond with the Society, furnishing such information in regard to the hygiene of the Army and its Medical and Surgical Practice as might be of interest to the Society. It was also on motion—

"Resolved: That a summary of the proceedings of this meeting be published in the local newspapers and that all physicians engaged in regular practice of medicine be invited to coöperate with us in accomplishing the object of the Society, particularly in establishing a standard of high professional etiquette and in obtaining and disseminating, through the profession, information in regard to epidemics, the influence of our climate upon chronic diseases and other similar questions of local interest. By order of R. H. Ward, Secretary of the Society."

Judging from the above and from the item of July 6, 1864, the society did not wholly discontinue during the war.

It is notable, also, that in all the early records the Committee on Ethics occupied a prominent place in the list of officers, and there was a continuous effort to maintain a high standard, but men were continually being tried for violating the principles of ethics laid down. For example, it is related that on one occasion the society passed a resolution that no physician, not a graduate of a medical college, could be a member of the local society. The secretary had been particularly active in securing this piece of legislation which automatically dropped one of the members from the rolls. The member who had been dropped went east and in due course of time returned with a diploma, and then proceeded to investigate the secretary, who was found to be masquerading under a false diploma and was in turn dropped.

The stealing of patients also appears to have been an all too common procedure, and was as frequently a topic of conversation as is fee-splitting in our day. Considering the high character of the men involved, it may not be invidious to relate the following story told me by Dr. A. W. Abbott, as showing the spirit of the times. On one occasion Dr. Phillips, meeting Dr. Ames on the street, said to him: "Hold on, I want to talk to you. You have been stealing my patients, but every time you steal one from me I will steal three from you to get even." Conditions such as this gave rise to the statement that the physicians with the fastest horses always had the most patients.

The *State Atlas* of March 9, 1864, reports ten lawyers in Minneapolis, and five in St. Anthony, with ten practicing physicians on both sides of the river. "Strangers can calculate how long they can live and grow rich at the Falls."

Hereafter follow all the newspaper notices which offer material information concerning the Society. A complete list of all items can be found in the *Journal-Lancet* of March and April, 1918. There are wide gaps, some of which may be filled by members or by further research, but it has required a tremendous amount of labor to achieve even this incomplete result. From 1867, when the *Daily Tribune* began publication, it is possible at least to keep track of the annual meetings and election of officers, and the latter are given, too, in the directories beginning in 1873 and being continuous except for several years hereafter mentioned.

Information is lacking in regard to the years from 1857 to 1866; yet, however much uncertainty there may be in regard to the other officers, there would seem to be little doubt as to who the president was in these forgotten years.

HISTORY OF MEDICINE IN MINNESOTA

Dr. Ames was the first presiding officer, and appears to have been a fixture, save only during his absence in California in 1868, until his death in 1874, when he was succeeded by Dr. Simpson, who was vice president at that time.

State Atlas, July 6, 1864:

"At a meeting of the physicians and surgeons held in Minneapolis at the office of Dr. Hill and Dr. Lindley, July 1, 1864, the following fees were established for the present:

"For a visit in town.....	\$2.00
"For a night visit in town.....	3.00
"When called into the country, per mile.....	1.00"

Evidently inspired by the foregoing, we find the following announcement in the *Tribune* of July 20, 1864:

"Dr. J. S. Eliot wishes to return his sincere thanks to his numerous friends for the liberal patronage hitherto bestowed and by his past successes in curing diseases and by physio-medical system of practice he hopes to merit a continuance of the confidence of a generous public.

"The greatly increased price of medicine of all kinds compels the undersigned to advance his fee bill as he furnishes his own medicines instead of sending to the drug store for them any time he makes a visit or prescription. For a visit in town and medicine, \$2.50.

"Special attention given to all diseases of the throat and lungs.

"Jacob S. Eliot, Botanic Physician, Minneapolis, Minn."

The *Tribune*, in February, 1867, remarks facetiously that lawyers and doctors are getting as numerous here as mud-hens on a summer marsh.

The *Minneapolis Daily Tribune*, of May 29, 1867, gives the professional cards of J. S. and A. F. Elliot, and then announces that A. F. Elliot "embalms the dead."

Daily Tribune, June 6, 1867:

"The Union Medical Society of St. Anthony and Minneapolis met yesterday afternoon at Dr. Ames' office. The following officers were elected: A. E. Ames, President; N. B. Hill, Secretary; A. H. Lindley, Librarian; Committee on Ethics, Drs. G. S. Scott, A. A. Ames, J. S. Brown. Committee on Publications, Drs. O. J. Evans, Geo. W. Hall, A. Ortman. Resolved that this Society is highly gratified with the progress made in placing our city under proper sanitary regulations."

The latter statement may refer to the sanitary committee mentioned in the next paragraph.

Merwin's Directory, 1867:

"Saint Anthony and Minneapolis Union Medical Society meets on the first Wednesday of each month at 7:00 p. m. at the office of Dr. Ames, corner Bridge Square and Washington Avenue. President, A. E. Ames, M.D.; Secretary, N. B. Hill; Librarian, A. E. Johnson. Sanitary Committee, A. E. Ames, N. B. Hill, A. H. Lindley."

(To be continued in January issue)

President's Letter

NOBODY realizes better than outgoing officers that policies do not change materially in an organization such as ours. Officers seldom do more than interpret policies. They are in excellent position, however, to observe progress and evaluate undertakings. For that reason as the year draws to a close, we should like to sum up very briefly some of our impressions of the year 1939—a year that has merely brought another milestone in a steady past growth that has placed the Minnesota State Medical Association among the leaders of forward looking medical associations of the country.

January, 1939, found the American Medical Association under criminal indictment for monopoly in restraint of trade and Congress about to be asked to appropriate millions of dollars for a new health program. It found many state medical associations feverishly at work on health insurance plans and passage of enabling acts. It found a grave concern among Minnesota physicians over the national situation, but no immediate preparations for radical departures here. Instead, the Minnesota State Medical Association was busy with a new and extensive program of co-ordinated medical and public health education. In co-operation with the University, the State Board of Health and other state directed activities, it was reaching out into new fields of postgraduate education. It was continuing its established programs of education to the public and especially its information to legislators on all legislative proposals touching medicine and the public health. It was continuing its studies on social and economic conditions affecting medicine and participating in the American Medical Association Survey of Need and Supply of Medical Service. It was carrying forward its policy of intimate cooperation with official agencies in the administration of relief and of social security aids.

Looking back we believe that the coöordinated program has been of value. Information to the legislature has been so ably handled that no measures of any kind, which might be detrimental to the public health, have passed our Minnesota Legislature. Also the signal legislative gain of last year by which the relief client was given his choice-of-vendor was made specific for services in the new law. The new Division of Social Security has shown a disposition to work as closely with the doctors as former administrators in the handling of medical care for recipients of relief and aid. Furthermore, results of the survey have borne out the experience of all who are familiar with conditions—that medical facilities are adequate in Minnesota and that there is no need for hasty experimentation here with new forms of medical service.

During the year, the Association has been carefully studying the experiments in medical insurance in other states. The time devoted to some of these experiments, especially those in which organized medicine in a locality, county or state has taken charge directly or indirectly, has been so short that no definite judgment can yet be entered. The Association has deemed it best, so far, to watch carefully all of these various efforts, gather all the information it can on medical insurance problems, and from this background, be in a position to help any locality or county choosing to try such an experiment.

As the year ends, the indictment against the American Medical Association has been thrown out of court and the decision of the judge has been upheld by the Supreme Court. Also the Wagner Health Bill, never reported out of committee last year, faces grave competition for the attention of Congress in the 1940 session.

In this connection a bit of philosophy recently quoted from Elsa Maxwell may have some applicability to us as physicians in our relation to social and economic problems: "Take the serious things more lightly and the light things more seriously." We have wondered of late, as we watched, whether physicians should not take heed. Perhaps if we attend enough to the problems in our towns and our own states, the national problems will take care of themselves better. At least we shall have more proven experience to contribute to the national cause.

We wish space might permit the recording of the splendid activities of many individuals in our Association and the excellent work of the committees. However, where to begin and where to end would be a difficult matter to decide.

To our full-time and part-time faithful workers, to fellow officers, the council, all of the committees and the entire membership, thanks for your patience and coöperation. To the new president and all of his workers, best wishes for the coming year.

Sincerely,

GEORGE EARL, President,
Minnesota State Medical Association.

EDITORIAL

MINNESOTA MEDICINE

OFFICIAL JOURNAL OF THE MINNESOTA STATE MEDICAL ASSOCIATION

Published by the Association under the direction of its Editing and Publishing Committee

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BUSINESS MANAGER

J. R. BRUCE

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DECEMBER, 1939

Number 12

THE PLATFORM OF THE AMERICAN MEDICAL ASSOCIATION

THE accusation has been made that the physicians of the country through their organization, the American Medical Association, oppose all change in medical practice. For this reason the trustees of the American Medical Association have adopted the following platform, which well expresses the viewpoint of the physicians of the country regarding methods which should be adopted and general principles which should be followed in legislation. The platform consists of eight planks.

DECEMBER, 1939

1. The establishment of an agency of federal government under which shall be coördinated and administered all medical and health functions of the federal government exclusive of those of the Army and Navy.

Since 1875 the American Medical Association has advocated the establishment in the federal government of a single agency, not necessarily a department with a cabinet representative, to administer the various health activities of the government. At present the United States Public Health Service is in the Federal Security department; the Maternal and Child Welfare Bureaus in the Department of Labor; the Food and Drugs administration in the Department of Agriculture, et cetera. Such a reorganization would result in the avoidance of duplication, greater efficiency and great economy.

2. The allotment of such funds as the Congress may make available to any state in actual need for the prevention of disease, the promotion of health and the care of the sick on proof of such need.

Physicians recognize the need for federal appropriations for certain public health activities. They have advocated the appropriation of funds for campaigns against maternal mortality, venereal diseases and cancer. They have recognized the necessity of providing medical care for the entire population and have given generously of their time. They have protested, however, against the allotment of federal funds to be matched by the states for the wholesale increase of medical activities with no consideration of actual need. Too often the government has to sell the idea to the states that here is money available for activities the states did not think they needed. Taxpayers too frequently look upon federal grants as gifts and forget that they themselves furnish the funds, directly or indirectly. The physicians propose, therefore, that if a state presents concrete proof of the need of federal assistance for the prevention of disease or the care of the sick, such state be aided individually.

3. The principle that the care of the public health and the provision of medical service to the sick is primarily a local responsibility.

EDITORIAL

The principle of the local determination of medical need and the local provision and administration of medical relief is fundamental. Neighbors and local officials are in a much better position to determine who need assistance than officials or their clerks in Washington. There might be danger of a locality shifting its own responsibility entirely to Washington.

4. The development of a mechanism for meeting the needs of expansion of preventive medical services with local determination of needs and local control of administration.

The profession recognizes the necessity of expanding public health activities and proposes that a federal agency would be the proper one to give advice and suggestions, but that local officials should determine the need and expend the available funds.

5. The extension of medical care for the indigent and the medically indigent with local determination of needs and local control of administration.

This plank takes into consideration the fact that in one locality a certain low income group may be medically indigent (that is, may be able to meet the cost of essentials such as food and shelter, but not the cost of a medical emergency) while in another locality this group would not need help. The medical profession is desirous of solving the problem of providing proper medical care for this low income group. It believes, however, not in blanket regulations for the whole country, but in local determination of needs and administration of remedies.

6. In the extension of medical services to all the people, the utmost utilization of qualified medical and hospital facilities already established.

Claims regarding the need of more hospitals in the United States have been grossly exaggerated. Reliable statistics show that there are only thirteen counties in the country more than thirty miles from a suitable hospital. There are more hospital beds in this country per 1,000 population than in any other country in the world. Furthermore, the private hospitals are only 70 to 75 per cent filled. The indiscriminate locating and building of hospitals by the government, such as has already been reported, is gross extravagance and unfair to already existing hospitals. The sensible solution is the utilization of present facilities.

7. The continued development of the private practice of medicine, subject to such changes as may be necessary to maintain the quality of medical services and to increase their availability.

The profession knows that the institution of private practice provides the best medical care for the people. Any changes which should be made in making adequate facilities more available to those unable to pay the present cost should not sacrifice private practice itself. In other words, we are opposed to all proposals whereby the physician is directed and controlled by the government. The low mortality and the high plane of the health of the American people compared with that of all other countries, vindicates the system of private practice.

8. Expansion of public health and medical services consistent with the American system of democracy.

Physicians believe in democracy and not in a paternalistic form of government. There is some basis for the belief that nationalizing the medical profession is the first step toward socialism or totalitarianism. Handouts by the Roman governments doubtless led to the downfall of the empire. Individual responsibility and reliance were sacrificed for temporary security. The average citizen wants to continue to exert his freedom of choice when it comes to a physician. The average physician wants to continue to stand on his own feet.

**NATIONAL PHYSICIANS' COMMITTEE
FOR THE EXTENSION OF
MEDICAL SERVICE**

WHEN Mr. Frank Gannett, the well known newspaper editor of New York state and the inspiration of the National Committee to Uphold Constitutional Government, allowed his name to be proposed as presidential candidate for the Republican Party, the non-partisan character of this committee became lost. The Physicians' Committee for Free Enterprise in Medicine, which was closely associated with the Gannett Committee, lost thereby its non-partisan character. For this reason a group of prominent physicians formed a new committee, which is known as the National Physicians' Committee for the Extension of Medical Service, to carry on the activities of the Physicians' Committee

EDITORIAL

for Free Enterprise in Medicine in a strictly non-partisan way.

Dr. Edward H. Cary of Dallas, former president of the A.M.A., is chairman of the new committee. Dr. Austin Hayden of Chicago is secretary and Dr. N. S. Davis, III, of Chicago is treasurer. The other members of the National Committee are—Dr. Irvine Abell, Louisville; Dr. F. F. Borzell, Philadelphia; Dr. John A. Hartwell, New York; Dr. Roger I. Lee, Boston; Dr. A. McMahon, Saint Louis; Dr. E. H. Skinner, Kansas City; Dr. W. F. Braasch, Rochester; and Dr. C. B. Wright, Minneapolis.

The purposes of this National Committee are the making more widely available the services, more generally known the achievements, and safeguarding the independence of American Medicine.

When one considers the high plane of medicine in the United States, the low mortality and morbidity in its population, and the general availability of medical care, there seems to be little excuse for the determined efforts being displayed to revolutionize medical practice in this country. Propaganda in its worst form is being fostered, even by the federal government, through lay magazines, the press and the radio in an effort to discredit the medical profession. There is need for this new National Committee of physicians to operate in a national sphere, as our state medical associations are doing within state borders, to bring the truth to the public and to do everything possible to maintain free initiative in medicine for the good of the public.

A small group of physicians from throughout the state met in Saint Paul, November 4, at the call of Dr. F. J. Savage, to hear Mr. John M. Pratt, executive administrator of the new National Physicians' Committee, explain the objectives of this new committee. Mr. Pratt resigned his former position with the Gannett Committee and will take part in meetings all over the country similar to the Saint Paul meeting, which was the first.

Dentists, pharmacists and other allied groups, interested laymen, as well as physicians, will be given the opportunity to support this nationwide committee, by becoming members and making any contributions they are able. The purposes of this National Committee supplement and in no way conflict with the activities of the A.M.A. It is not generally understood that the propagan-

da and legislative activities of the A.M.A. are limited, inasmuch as its main function is the scientific betterment of its members. If any considerable part of its activities were devoted to legislative affairs, the organization would be subject to the income tax according to the regulations of the powers that be.

MEDICINE AND THE JUDICIAL MIND

MORE than at any other time in its experience the medical profession is having occasion now to pay attention to the higher courts and the men who compose them. On the ultimate outcome of the present effort in Washington hangs the very life of medicine as a profession and we who are members of it would be lacking in a very human characteristic if we did not do a little quiet wondering as to the type of men who are the arbiters of our professional destiny.

The recent death of Justice Butler enhances this feeling of curiosity, for now there will be five out of the nine men in the Supreme Court appointed by the present administration and avowedly sympathetic to its trends and ideas. What will be their attitude toward this movement to undermine the fundamental principles of our profession and make a trade of our vocation and a union of our organization? Admitting that they may be friendly to the social security angle of the matter and therefore inclined to agree with the administration's course of action, will they lose sight of the fact that their own profession is no less vulnerable than ours, and will they want to see it "socialized" too?

In a book recently published by the University of Minnesota Press, entitled "Marshall and Taney, Statesmen of the Law," the author, Mr. Ben W. Palmer of the Minnesota Bar, goes into matters like this very ably. The first chapter, with the caption "Are Judges Human Beings," covers thirty-six pages in an analysis of a three-hundred-year period in history, which in the light of present events should be of great interest to every one of us, as well as the author's critical study of the lives of the two men whose names constitute the title of the book. The historical background of the present situation should be very illuminating.

G. C.

EDITORIAL

MEDICINAL SOURCES OF VITAMINS A AND D

THE onset of winter again gives emphasis to the frequent necessity during these months to supplement the dietary vitamin intake of patients, particularly in vitamins A and D, with medicinal sources of these vitamins.

The minimum daily intake of vitamin A from all sources necessary to prevent evidences of deficiency is 4200¹ to 5200² U.S.P. units for infants, 5500^{1,2} units for children, 6250³ units for adults, and 8700² units during pregnancy and lactation. The recommended minimum daily intake of vitamin D is 625³ U.S.P. units for all ages, with at least 800⁴ units during pregnancy and lactation. It should be noted that these are minimum rather than optimum requirements, which are 3 to 4 times these amounts.

Carotene is the chief source of vitamin A alone; irradiated ergosterol of vitamin D alone; while the fish liver oils constitute a potent source of both vitamins. The differing vitamin content of the various fish liver oils has, however, given rise to some confusion.

Cod Liver Oil, U.S.P., is required to have a minimum vitamin content per gram of 600 U.S.P. units of vitamin A and 85 U.S.P. units of vitamin D. The recommended U.S.P. dose of 8 c.c. (2 drams), therefore, yields 4800 units of A and 680 units of D. Numerous over-strength preparations of cod liver oil are available, permitting proportionate reduction of the dosage volume, but considerable caution is necessary in employing these preparations to be sure that the D component has been increased proportionally to the A component. The D:A ratio in U.S.P. cod liver oil is 1:7 and this ratio should be maintained, or at least should not be lower than 1:10 in these stronger preparations.

Burbot Liver Oil, N.N.R., is obtained from the only fresh-water member of the cod family. It is seven and one-half times stronger than a standard cod liver oil in both vitamin components, and the recommended dose of 1.0 c.c. (15 minims) furnishes 4480 units of A and 640 units of D.

Halibut Liver Oil, N.N.R., is seventy-five times as potent as a standard cod liver oil in vitamin

A, but is only six times as potent in vitamin D, the D:A ratio being 1:90. The recommended dose of 0.2 c.c. (3 minims) furnishes 8960 units of A but only 108 units of D. Halibut liver oil is, therefore, a relatively poor source of vitamin D. This relative deficiency of vitamin D is overcome in the preparations of Halibut Liver Oil with Viosterol by the addition of enough viosterol to make the oil 100 times as potent in vitamin D as a standard cod liver oil, the 0.2 c.c. dose then yielding 1700 units of vitamin D.⁵

Percomorph Liver Oil, N.N.R., is obtained chiefly from tuna and is 100 times as strong as a standard cod liver oil in both vitamins. The recommended dose of 0.2 c.c. (3 minims) yields 12,000 units of A and 1700 units of D, or approximately twice the minimum requirements for both vitamins.

Where it is desirable to administer either of the vitamins alone Carotene in Oil, N.N.R., as a source of vitamin A only, furnishes 6600 units of this vitamin in the recommended dose of 0.9 c.c. (14 minims), while Viosterol in Oil, N.N.R., as a source of vitamin D only, yields 2000 units of vitamin D in the recommended 0.2 c.c. dose.

HAROLD N. WRIGHT, Ph.D.

CHRISTMAS SEALS

THE approach of the thirty-third annual Christmas Seal sale brought an enthusiastic approval of the campaign from Dr. Rock Sleyter, Wauwatosa, Wisconsin, president of the American Medical Association. "It is a pleasure," he said, "to give my hearty endorsement to the Christmas Seal campaign of the National Tuberculosis Association. I have been actively interested in this promotion for the last quarter of a century."

The sale of the Double-Barred Cross seals is identified with the fight against tuberculosis which is being carried on in this country by nearly 200 affiliated organizations, of which the Minnesota Public Health Association and county organizations are a part. The sale opens November 30 and continues through Christmas Day, with the theme this year being, "Protect Your Home From Tuberculosis."

The Minnesota State Medical Association is actively coöperating with the campaign. Includ-

¹Stiebeling, Bur. Home Econ. Rep., 1936.

²Comm. on Nutr., League of Nations, 1935.

³New and Nonofficial Remedies, 1939.

⁴Jean and Stearns, J.A.M.A., 111:703, 1938.

⁵Wright and Montag, Textbook of Materia Medica, Pharmacology and Therapeutics, W. B. Saunders Co., Philadelphia, 1939.

IN MEMORIAM

ed in the Speakers' Library Service material is much valuable information prepared through the coöperation of the State Medical Association with the Minnesota Board of Health and the Minnesota Public Health Association.

Fortunately, we have two strong allies in outwitting tuberculosis—the tuberculin skin test and the chest roentgenogram. Indeed, so effective is this defense that if we could apply it universally we might hasten the eradication of tuberculosis by several decades.

Individuals with active tuberculosis are diminishing in number, but, by the same token, are vastly more difficult to detect. Undetected, they are just as deadly to those with whom they come in contact as they were at the turn of the century. The menace is still with us. It will be increasingly difficult to locate the remaining cases and more costly per case when discovered. Yet there is no other way except to work eternally at it, despite the labor involved, despite the immediate cost. As long as a single case of tuberculosis exists in a community the job is not done. No home is safe from tuberculosis until all homes are safe.

E. A. M.



In Memoriam

Carl D. Kolset
(1876-1939)

Dr. Carl D. Kolset, Sanborn, Minnesota, died at his home, October 18, 1939, following an illness of three years.

Dr. Kolset obtained his medical degree at Hamline University in 1905. He practiced medicine at Brooten from 1910 to 1916 when he moved to Benson. In 1921 he moved to Sanborn where he practiced until illness forced him to retire in 1938.

Dr. Kolset was a native of Norway. He was active in civic and church affairs during his residence in Brooten and served for a time as president of the village council. He was a member of the Redwood-Brown County Medical Society, the Minnesota State and American Medical Associations.

* * *

George Aitken Stevenson
(1854-1939)

Dr. G. A. Stevenson of Albert Lea died October 25, 1939, at the age of eighty-four.

Dr. Stevenson was born in 1854. He attended the College of Physicians and Surgeons at Keokuk, Iowa and obtained his degree from Rush in 1889.

Dr. Stevenson practiced for years in Alden before moving to Albert Lea. He later specialized in eye, ear, nose and throat diseases. He was a member of the Freeborn County Medical Society and was its second secretary, succeeding the late H. Hamilton Wilcox. He was also a member of the Minnesota State and American Medical Associations.

For years past Dr. and Mrs. Stevenson have been making their home at the Hotel Albert, Albert Lea, where the doctor was a well-known character.

Dr. Stevenson is survived by his wife and two children, Robert of Chicago and Mrs. B. J. Clausen of Boone, Iowa. One son, George, died a number of years ago in the west.

* * *

Victor Rousseau
(1872-1939)

Dr. Victor Rousseau of Maple Lake, Minnesota, died October 26, 1939, at the age of sixty-seven.

Dr. Rousseau was born at French Lake, Minnesota, July 20, 1872. He attended the Northern Indiana College at Valparaiso, Indiana, where he received his degree in pharmacy in 1901. Attending the University of Minnesota, he obtained his M.D. degree in 1905. His internship was served in Saint Luke's Hospital, Saint Paul.

Dr. Rousseau was a member of the Wright County Medical Society, the Minnesota State and American Medical Association. He served at one time as Health Officer of Maple Lake.

THE PILGRIMAGE TO ROCHESTER IN HONOR OF DR. WILLIAM J. MAYO AND DR. CHARLES H. MAYO*

INTRODUCTORY REMARKS

GEORGE EARL, M.D.

President of the Minnesota State Medical Association
Saint Paul, Minnesota

WE have come here today to pay a very special tribute to two great men—our friends—who have left us.

These men were recipients of honors and tributes without number during their lifetime and after their deaths. We can add nothing, perhaps, to the brilliance and variety of the things that have been said about them nor to the weight of distinction of those who have said them.

We are here instead to acknowledge the special debt and express the special affection in which these two men were held by their medical colleagues in Minnesota.

It is safe to say that Dr. Will and Dr. Charlie regarded themselves first as country doctors of Minnesota no matter what splendid titles and degrees were bestowed upon them. They were devoted to their own town, their own people, their own state and to their fellow practitioners in Minnesota. They brought an added luster to all men who practice medicine in Minnesota. But more than that, they never failed in personal kindness and in helping a fellow practitioner. They were loyal members of the Minnesota State Medical Association and served it faithfully as members and in the highest offices the association had to bestow. They attended meetings as a matter of habit and example and year after year they themselves and the members of their organization have made unique contributions to our programs. They made tremendous contributions to the education of physicians in Minnesota and to elevation of our standards of practice. Every one of us has reason to be grateful for their friendly assistance and every one of us has benefited by their work.

This memorial pilgrimage is designed to give expression to this feeling of gratitude and of affection. The term pilgrimage is unusual. It was suggested to

the Council by Dr. E. L. Tuohy and was retained because it conveys a special significance. It carries with it a spiritual association which is not inappropriate for physicians of Minnesota who are today visiting the graves of two of their greatest men.

We hope that all of you will join the procession that forms immediately after Dr. Tuohy's address here, when we join Dr. Charles W. More and Dr. Arnold Schwyzer in placing the wreaths of the Minnesota State Medical Association on the graves at Oakwood cemetery.

It is especially appropriate that Dr. E. L. Tuohy of Duluth should express for us here our feeling as fellow practitioners for Dr. Will and Dr. Charlie. Dr. Tuohy has known them intimately. He has practiced medicine with distinction for many years, and he has been associated with the work of our association. He speaks with authority for the average practitioner of medicine in Minnesota.

It is also fitting that Dr. Arnold Schwyzer of Saint Paul and Dr. Charles W. More of Eveleth should be selected to place the wreaths on the graves of these illustrious men.

Dr. Schwyzer has been chosen to place the wreath honoring Dr. William James Mayo. This choice is most fitting, for Dr. Schwyzer was the contemporary of the Mayos not only from the standpoint of time of practice, but also in personal friendships and acquaintance and in outstanding medical achievement.

Dr. More has been chosen to honor the memory of Dr. Charles Horace Mayo because of his close personal relationship with the great medical leader. They were classmates in medical school, and through the following years a warm, intimate friendship continued between them. Dr. More has achieved an enviable reputation and is recognized as a man of highest personal standing, truly representative of Minnesota medicine.

AN EXPRESSION FROM THE MINNESOTA STATE MEDICAL ASSOCIATION

EDWARD L. TUOHY, M.D.
Duluth, Minnesota

WHATEVER is spoken here today matters little in comparison to the circumstance of our presence and participation in the ceremonies planned and arranged by our State Association. We have invited ourselves to come and to do honor to two of Minnesota's greatest sons. They were our fellow mem-

bers. Fame came to them within our vocation—the field of Medicine. It is futile to compare them with other contemporaries or attempt to surmise what history shall ultimately fashion out of current events and personalities. We are here to acknowledge a present debt. Fortunately, the men we honor today were abundantly recognized while they lived. They were honored in every possible way by this State Associa-

*Remarks made on the occasion of the Pilgrimage, October 27, 1939.

PILGRIMAGE TO ROCHESTER

tion which they did so much to upbuild. The honor we humbly proffer today is empty so far as any tangible commodity or token is concerned, but it comprises an evidence of love and affection that comes from the depths of our hearts. These men shall not be forgotten so long as our Association treasures loyalty to our guild and appreciation of Hippocratic traditions. The fact that we are here to voice these sentiments testifies clearly to the bereaved families, near relatives, professional associates and fellow townsmen, the deep sympathy that is ours and makes it unnecessary for me to mention my personal limitations in venturing to fittingly express your feelings.

It was Talleyrand who said, "Speech was given to man wherewith to conceal his thoughts." World diplomacy today helps establish the correctness of that sordid implication. Faith between nations has reached an all time low. It is difficult to call to mind anywhere conditions, social and economic, wherein faith in each other is fully manifested by groups of men. Family respect and mutual dependence have been outmoded and liquidated in some countries. The idea of "Peace on earth, to men good will," by those who seek their bread through service is strangled by those who, blinded by hate, resolve to live through merciless force and oppression. It is fitting, therefore, and opportune, to call your attention to the possibilities of peace, faith and service, as exemplified in the open lives of the Mayos here in Rochester, Minnesota. The devotion of these two great men to their parents has been proverbial. The capacity they had to live as a unit—to converge their strength and superb faculties upon a common purpose—is phenomenal. So outstanding was their mutual devotion that Harvey Cushing (just deceased) recently wrote,* "Not since the somewhat mythical attachment of those Fifth Century physicians Cosmas and Damian, both of whom came in due time to be sanctified, has there been anything quite like it." Sorrowful though we may be . . . and would have been at whatever age they had passed . . . we cannot help but rejoice that these men who obtained so gloriously together in life were not long separated even by death. This circumstance of such outstanding complementary personalities, so richly endowed with genius, transcends everything else. Praise, adulation, honors, specific commendation and degrees—all have been heaped or conferred upon them in immeasurable degree, and yet, those who knew them may well feel that all these merits did not begin to measure their worth in terms of their neighborliness, citizenship and capacity for leadership. In the short space of time since their death scores of reviews for the various medical and surgical societies in which they had membership have been set up and spread upon minutes. Not a few have been published. These are at our disposal and for the comfort of the bereaved families. I choose to feel that this is not the occasion nor the circum-

stance either to repeat or catalogue what you all know. Rather do I prefer to discuss some of the manifold powers and attainments that have so conspicuously endeared "Will and Charlie" Mayo to their Minnesota confrères.

We must not be accused of immodesty or of fulminant local pride if we smile back at an admiring world as we proclaim: The men you honor were on our Minnesota team. You recognize their extraordinary talents through the medical literature they embellished, through the countless great from all nations who came to observe and wonder; through the great clinic they built up and the teaching institutions they endowed. But we, their neighbors, know what an "M" means in Minnesota. We feel they were the very first in Minnesota to deserve the letter. The alliterative euphony of Mayo, Minnesota, and Medicine, arises through one of the most fortuitous linkings of sturdy family name, environmental salubrity and vocational fitness any fairy godmother could devise. They truly and undisguisedly loved this state. They idealized its soil and even its climate. Whenever the occasion arose W. J. Mayo never failed to pay tribute to those hardy Minnesota pioneers, among whom his father stood out conspicuously. Others might be patronizing (as to the land or those who tilled it) in terms of its fertility and source of human sustenance, but it remained with C. H. Mayo, at the height of his technical fame and skill, to always announce himself as a farmer and to live on a Minnesota farm. I have known but one other man who shared with the Mayos such complete satisfaction with Minnesota as a habitation: no matter how bitter the winters or withering the summers it was all the same—Minnesota was everything—it was home. That other man was my father.

We lived on a farm three miles from Chatfield, about twenty-five miles from here. Among my earliest recollections is the circumstance of the illness of a neighbor, a Mrs. Keefe. In the spring of the year, when roads were quagmired, W. J. Mayo drove out to the Keefe farm, from the village, after coming down by train, to minister to her. Unfortunately memory fails me utterly as to the outcome of the illness of this good woman; but whether she lived or passed to her reward the fact that Doctor Mayo had visited her established in the consciousness of her family and the community the certainty that the utmost had been done for her. This local faith in the skill and integrity of the Mayo brothers was the factor that was destined to be extended to all who came from far and wide to develop alike their fame and their Clinic. Some doctors in later years, viewing the technical complexity of the Mayo Clinic, may have smiled when the Mayos spoke of having been "general practitioners," but I know that they knew full well whereof they spoke. When it comes to the matter of pride of birthplace, I hold it as one of my greatest involuntary achievements—I was born in Olmsted County, and the Minnesota Medical Mecca is its County Seat! With all the rest of you

*Cushing, Harvey: The Mayo Brothers and Their Clinic, Science, 90:225, (Sept. 8, 1939).

PILGRIMAGE TO ROCHESTER

who entered Medicine in Minnesota in my medical generation, that began practice the first decade of this century, we witnessed, step by step, the magical development of this center of medical practice and teaching. The popular account of early development places justifiable emphasis upon the circumstance of the early cyclone and the need of facilities for the injured. That was important, but there was a lot of much more subtle spade work done that only doctors who ever attempted to organize complete medical service may well appreciate. I was told by one of the brothers years ago that with their earliest abdominal surgery, so intent were they upon a safe convalescence, that one or the other frequently remained in the hospital overnight, where in the absence of any semblance of an interne service, and with only a few, overworked nurses, they met every emergency. There was no such thing as "passing the buck"—there was no one to receive it.

If I mention a few of the personal factors that betokened the genius of the Mayo brothers I do not wish to imply that I knew them intimately. While on many occasions I had their personal recognition, I may simply state that I shared their confidence in no greater degree than did all of you who knew them at all. A word of praise here; a commendatory note there. The busiest of men, they never seemed too occupied to notice people. We were all invited to come here whenever we could. Every convenience and much personal hospitality were at our disposal. We began to profit early by the example of this rapidly developing miracle in the organization of medical and surgical service. And what an inspiration it was to come here and visit! Our Minnesota profession became one of the most alert and qualified among all our states. The competition that the fearful and suspicious might surmise and suspect, found a Minnesota profession equal to it. It was and is a profound stimulus. We have all had to be better doctors. The example offered here in daily practice, the research activities so freely publicised, the developing specialties, the skill of staff member presentations at medical meetings, the willingness to travel widely to relatively small Society groups, their publications—all helped attune our profession to the medical progress of the world at a time when Medicine was advancing by leaps and bounds. Medicine was certainly on the march, and it required genius, as well as humility, to realize its possibilities, to sense its imperfections, and acquire a technic to keep abreast of the times. The Mayos early learned how to do it.

The Mayos became the foremost medical travelers of all times. So far as I know, no one has previously made that formal statement. Long before they trekked outside our state they made regular visits to see the late Charles Wheaton and other distinguished Twin City colleagues. They were ever willing to learn from the men in this locality, such as Staples and McGaughey of Winona, and Andrews of Mankato. Their restless zeal to advance knowledge as well as

technic led them to all the surgical centers of our country, and later abroad. They especially admired Deaver of Philadelphia and Murphy of Chicago; they loved Ochsner. It was a liberal education in itself to hear them tell of their travels and quote the distinguished surgeons of their day. No formal lectures, exhibitions or clinics, here or abroad, ever inspired me as much as the affable, impromptu remarks they made to us "visiting firemen" sprawled over the gas pipe bleachers. The heavy bushy eyebrows signalled the smile of recognition the face masks could not conceal. Much medical wisdom and selective practical philosophy emanated from these surgical theatre colloquies. It is obvious to all those who knew them that these two men were quite different; but each had his own way of exhibiting his wisdom and understanding. Their methods were never brusque, the humor coarse, the attitude critical, or their purposes demeaning. From this operating room contact alone one might sense the universality of their minds, the current medical and surgical trend, the freedom from cant, and grateful recognition of all those of like spirit around the world from whom they were so willing to learn. Is it any wonder then that Rochester became the medical cross-roads of the world; that our Minnesota interests became world-wide, and the Clinic and hospitals spread apace over their foundations.

The Mayo Clinic grew because the faith the brothers had in each other was extended to a brilliant sequence of men and women whom they led into their confidence as well as their organization. The consolidating influence of family name was never ignored but the fatal blight of nepotism has always been averted. Need I mention the scores of men and women they sponsored—those whose talents became so closely knit to their own that cleavage never obscured or marred the ultimate purposes and objectives. To illustrate my meaning, permit me to refer to the cleverness of some early hands that worked more or less unseen and voices that contributed heavily to the medical melody that was to become symphonic. It was indeed a truly inspired chorus of doctors. There was M. C. Millett, a native of nearby Dover, Minnesota, who worked for years in the basement of old St. Mary's Hospital, and pioneered so fruitfully the diagnostic genito-urinary work, later brilliantly expanded by Braasch and his associates. Then, there was E. K. Beckman, who came down here from the superintendency of the Minneapolis City Hospital and in a short time became conspicuous for the surgery of the central nervous system that Adson and his associates have so much advanced. The incomparably gifted Henry Plummer was a local Minnesota boy whom W. J. Mayo noticed because he was dickered around with a microscope and wanted to know about things. He was perhaps the most original and creative mind the Clinic ever helped to develop. This building is his monument and this beautifully appointed room bears his name. E. Starr Judd is buried here, with his illustrious preceptors, in the city of his birth. Here he rests eternally from the

PILGRIMAGE TO ROCHESTER

labors he superhumanly assumed. His were the first skilled hands that joined with the Mayos to carry the surgical load, and to advance technical and diagnostic achievement. Two very gifted internists, Charles Stanley McVicar and George Brown, died here long before they had time to fulfil their brilliant promise. R. D. Carman brought to the Clinic and developed the priceless boon of gastro-intestinal fluoroscopy. He died of the disease he helped so many others to uncover. Obviously, these names, chosen at random, do not comprise the list. But all of them, those who have retired, like Louis B. Wilson, and the various members of the active staff, its business and personnel officers and attendants . . . each and all, in their time, fell under the spell of the great leaders. First, last and all the time, the staff members were taught by example and by word of mouth to have faith in each other. Antagonisms and animosities, that have so much interfered with the lives of doctors of all times, were here minimized. Witness, within the historical period, the belligerent, stormy lives led by such men as Semmelweis and John Hunter: the one driven to insanity and despair, the other to furious excesses. The approval, consideration and support both needed so much never came. Recall the squabbles attendant upon early Revolutionary War Period Medicine in Philadelphia. What a wastage of fellowship and energy abounds in most communities, even today. How purposeless personal bitterness, born of competitive zeal, has always been, and to what an extent internecine quarrels have alienated the public. Here we have an objective evidence of the possibilities accruing to doctors who stick to their profession, have faith in their immediate confrères, and an understanding of the possibilities of public service.

They never started out to develop this plant. Each day, each month, each year, came with its multiplying duties as well as opportunities. Each of us in our own small sphere should remember this. The type of development witnessed here is never going to be repeated anywhere. If one could obtain a cross-section of the Mayo Brothers' minds at any fixed time he likely would have found there as much surprise at the extent of medical growth in Rochester as any outsider might voice. W. J. Mayo told me, on the occasion of the opening of the first Clinic building sometime about 1913, "Tuohy, no one but a bunch of fool doctors would build anything like this." There was a wealth of pride in his tone. Not long after that C. H. Mayo wrote, "I don't seem to be able to get into my office—somebody seems always to get there first." What I am groping to say is that a group of hands and alert minds began to coördinate in Medicine as they never did before. They did so under the *ægis* and guidance of two versatile and gifted geniuses, to whose memory we come today to pay tribute. It is not for us to say that public institutions, however guided and financed, may not sometimes accomplish comparably; but those who think so have a greater optimism than most of us share.

DECEMBER, 1939

It has been said that the Mayos would have been among our first citizens in whatever field they developed. However, pride in our own profession entitles us to the belief that Medicine gave their genius marvelous scope. They were successful because they sensed true values, and had the physical and mental powers to capitalize upon the period in which they lived. It was, indeed, a great expanding era for this Middle West. They became a part of it. They were, therefore, happy because they found themselves. They led blameless, busy lives. More than any other men of their period, they popularized Medicine. They made people feel that doctoring was a worthy vocation and that skills could usually meet and vanquish ills; in the face of defeatist disease forms, life could be prolonged and comfort promoted. Doctors flocked here with their families for professional service. The clergy of all denominations came likewise. Their gifts of personal service over and above that traditional with all physicians mounted as did their reputations. A great many of you here today, I am sure, would wish to voice with me the profoundest thanks and appreciation for life saving medical and surgical service rendered to those near and dear to us.

I have stressed at some length the matter of the value of faith, which the fruitful lives of these men illustrated. I must not overlook the faith of the Sisters who from the beginning and the pioneering of W. W. Mayo did so much to develop hospital service. Faith is like Justice, Truth or Beauty. It derives from infinite sources, and insofar as man exemplifies these abstractions he exhibits through his creative genius his eternal relationships. Therefore, in stressing faith in the development of the Mayo Clinic, it is more than fitting that we also pay tribute to that foremost and gifted surgical assistant, the late Sister Mary Joseph.* Her life, industry, devotion and forthrightness typified beyond any power of mine to describe the divine spark of service that these great religious orders have bestowed upon the art of nursing and the development of hospitals. Man without food and drink would be no more handicapped than medical science without hospitals.

The lessons we should retain from the lives of these men are obvious. A heavy task looms ahead of our guild. Our service has become complicated and expensive. The period of acclaim for our attainments is waning. The belligerent phase is with us characterized by whining importunates who feel that wishful thinking may provide (without effort or work) both necessities and security. We face this situation with many in our guild voicing the sentiments of Columbus' crew: "They would like to turn back." The tempo of progress and

*It was a very fitting coincidence that on the very day this Pilgrimage was held the Franciscan Sisters celebrated the 50th Anniversary of the Founding of St. Mary's Hospital. The exercises were attended by many who came for the Pilgrimage. Dr. C. W. Mayo presided. A number of addresses were given by visiting prelates and Rev. Father Schwitalla brought a message from the Catholic Hospital Association. Dr. Louis B. Wilson spoke with great charm and forthrightness concerning the early pioneer Sisters in nursing.

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the tradition of service established here at Rochester are not going to be easily maintained. In a war-torn world it is unfair to assume that any country is at peace or will long remain so. Political strife abounds even where military exploitation stops short of killing. The Mayos had unusual capacity for avoiding political entanglements. Witness the very long service of W. J. Mayo on the University Board of Regents—admired, respected and beloved by everyone, and trusted by all political parties. If time permitted, I could recount in adequate detail an illuminating experience when the University Medical School in Minneapolis was about to expand to the river bank across Washington Avenue. There was much opposition on the part of certain other departments within the University. I was one of a committee of medical alumni chosen to present to the late President Northrop our appeal for this expansion. John Lind, then at his prime, was on the Board of Regents, and voiced considerable nettlesomeness that we should ask so much. President Northrop had evidently had much argument poured into his ears, and he likewise demurred. After everyone else had spoken, W. J. Mayo was asked to express himself. The master spoke. In a very few words he settled the whole issue. He condemned no critic of the plan, but simply stated that there was nothing else for the University to do. Medical education had taken on a position in our national life where the second best was unthinkable. It had assumed the entire function in Minnesota of medical education, and the best position on the campus belonged to the Medical School by right of its primary service to the State and its people. There was no more said about it, and you know where the Medical School buildings were placed. It was perfectly clear that he had amazing gifts of leadership. In a country destined to be torn by partisan voting blocs, these brothers always understood the common man, and lacked that obtuseness that maneuvers to keep him "down the wind." They did not despise wealth, but sought it for what it would do rather than the social position it might bestow. Charles M. Schwab (recently deceased) thus spoke to the press on his recent return from Europe when asked about his wealth: "The mansions I owned came to own me." The Mayos long antedated the steel magnate in this discovery, and you know what they did with their private wealth. It is worth commenting upon how conspicuously doctors illustrate the fallacy of "trying to make a financial killing." The attempt made here to provide adequate financial emolument to "many medical men of many minds," is an achievement in itself that should be recorded in history. They were proud of the plan of insurance and retirement they helped devise for the staff members and hoped that financial worries (so prevalent among all professional folk) would not divert energies away from the problems of doctoring or prostitute ethical concepts when confronted with speculative disaster. God forbid

that deflating political crusaders may proceed to make all saving absurd.

Many attending here today are of the Alumni of the Mayo Foundation Fellowships. You know what the munificence and foresight of the Mayos have meant to you, and yet your indebtedness to this institution only varies in degree, because of your closer contact, with that of us in Minnesota on the outside who have had long and pleasant association with the men who taught you. A recent book reviewer has alluded to Yandell Henderson as "showing the working of a vigorous and imaginative mind—the mind of a physiologist who boldly applied his newly learned knowledge to important practical problems in Industry and Medicine, and achieved remarkable success." What the reviewer said of Henderson applies doubly to men like Thomas Edison, the Wright Brothers, Alexander Graham Bell, Henry Ford and the brothers Mayo. They turned science to very practical purposes and thus gave to the toiling masses an opportunity to look up at the stars—and live. The Mayo Clinic, The Foundation, and the Experimental Farm, the affiliation with the University of Minnesota—all have aimed to synchronize research with the actual practice of Medicine. Wherever you live and whatever associations you make, I am sure you are attempting to advance and elevate the standards of medical practice, and to promote understanding among your fellows. You were taught here much concerning specific methods. Scientific advance will make much of what you learned obsolete. Some diseases and indications will fade out of practice. That which will never fade, is the example and manner of life you have been privileged to observe. We live in a world flooded with falsehoods and propagandized with every virus of hatred, and yet, we must not doubt. An English geologist* has recently written a paragraph which plaintively sketches a hope of what unfettered science could accomplish. Here in cloistered Rochester I feel we actually see it. Here are his words: "The mere existence of a company of people declaring their interest in matters bigger than the squabbles of the political nursery, preferring to contemplate wider problems and vistas than those of the daily headline, should be enough to insure a nucleus of stability in the quicksands of opportunism."

We shall shortly go over to the spot where William James and Charles Horace lie buried; there to place wreaths over their graves. They have returned to the peaceful earth they loved so well. To doubt the future of Medicine at this time is to sin against the faith of our fathers. "Magnus est veritas† et prevalebit."

*Hawkins, Herbert L.: *Science*, 90:261, (Sept. 22) 1939.

†It is significant and worthy of mention that the above lines were written before the opportunity had come to me to read the inscription on the tomb of William James Mayo. Those who pause to read it may sense some of the surprise that came to me as I read, "He loved the Truth, and sought to know it."—E.L.T.

TRIBUTES GIVEN AT THE GRAVES OF DR. CHARLES H. MAYO AND
DR. WILLIAM J. MAYO, OCTOBER 27, 1939

CHARLES W. MORE, M.D.

Eveleth, Minnesota

WE ARE gathered here to honor two great men, Drs. William J. Mayo and Charles H. Mayo.

I am greatly honored to be asked to place this wreath in memory of my classmate, Dr. Charles Horace Mayo. What can I say about him that you do not already know?

He became known, loved, honored and respected over the civilized world, not only for his medical, surgical and scientific contributions, but for his wonderful personality, his friendly, generous, reliable and noble qualifications as a man. He was not given to pretense.

As a medical student, he was earnest, sincere and

congenial, attended the lectures regularly and came prepared to answer when called upon by his teachers and showed his desire to learn and be taught. This faculty he retained through his long and useful life.

The past fifty years represents the approximate period of development of the Mayo Clinic.

As we stand here commemorating the faithful and self-sacrificing service of these men, Dr. William J. Mayo and Dr. Charles H. Mayo, whom we loved and respected and who did so much to advance our profession, I wish to acknowledge the great privilege it has been to know and honor them through these years.

ARNOLD SCHWYZER, M.D.

Saint Paul, Minnesota

MEMBERS of the Minnesota State Medical Society, Friends: We have come out here to thank these two great men once more for all they have done for science, for mankind and for us in particular. Your committee asked me to place this wreath on Dr. Will's grave, as I have known him perhaps longer than most of you. I had the good fortune to become acquainted with him already in the early nineties when he often attended the meetings of the Minnesota Academy of Medicine. His keen eye, his sane practical views on any subject he discussed and, as I well remember, his eagerness for any possible improvement to be found in surgical measures would strike you at once, and no less than his distinguished personality.

Toward his colleagues he was a model of fairness and loyalty. I had my own lesson from him one day. Speaking of a well known surgeon whose publication in French on carcinoma of the stomach we had read together on a visit of mine down here, I told him of a remark this man had once made in his clinic, which sounded like a somewhat supercilious attitude toward our American surgery. This was forty years ago. A complete silence and a stony face were a well remembered lesson I received for readiness with poorly founded criticism. Such fairness toward others and his readiness to give credit to others was easily recognized as due to his own serene greatness and the immaculate cleanliness of his personality. Thus to mention just one incident. When describing a greatly improved method of handling a certain difficult problem he told us that the different steps were like flowers he had gathered from the research of others and his was only the ribbon with which he had tied the bouquet together. One of his great traits was a quick and sure judgment of others. This is one of the most important qualities in a man when building up a gigantic institu-

tion as the Mayo Clinic has become. He knew how to find and size up worthy and outstanding associates.

So many factors were necessary for the building up of an institution of such dimensions, factors of which many of us have probably never even dreamt. If I speak here of Dr. Will we all know that Dr. Charlie is included with a full and equal share in everything. In fact I could see Dr. Will frown if Dr. Charlie were not given at least a good half of all the credit. But I am helped out of this dilemma of being supposed to speak mainly of Dr. Will by Dr. Charlie himself. In my mind I can see him standing right here and with his bewitching smile give me a kindly wink never to mind and to go right on.

Such was their brotherly devotion, wonderful. None of us would hesitate to call it simply ideal.

These two, in unspotted harmony, worked together—one can well say—day and night, when with the growth of the clinic the responsibilities and manifold duties multiplied, in geometric proportions. Thus for instance, even at lunch time, while Dr. Will's guests conversed among themselves, he had his secretary by his side and letter after letter was disposed of, stacks of them. Just the same, he took notice of the trend of the conversation and would often interject some observation or reminiscence. And while it was work, work, work on all sides he kept a mental and psychic equilibrium which was wholly incomprehensible for me and is only possible in a giant.

Can you imagine how many times he had to set aside personal comfort? He was complete master over himself and nothing could divert his inner eye from his goal, their goal.

We all felt already early in their careers that these two brothers were to be leading surgeons, but who could have imagined that the world would some day see

WOMEN'S AUXILIARY

an institution of such renown and glory? If you consider that it was really their great father who started them on their road, their father whom they worshipped and who lies here between them, you are reminded of the Asklepion of the old classic Greek days where armies of the sick arrived from all sides. Homer tells us that in the healing of wounds Asklepios and his two sons were the most outstanding experts in the whole country.

The world has recognized these two brothers as stars of first magnitude. We, of Minnesota, who had the good fortune to come into personal contact with them, retain a deep gratitude for what we received from them. We not only profoundly respected them and were proud of them, we loved them in reverence; and we keep on loving them. Doctors Will and Charlie, what endearing names! For us they will always remain Dr. Will and Dr. Charlie. The one can never be mentioned without thinking of the other in the same spirit. Their unique harmony and brotherly love unites them into a picture which—bright and glorious—will remain in our hearts to the day of our own end. Their spirit remains with us. They are and remain ours.

(Placing of wreaths)

Friends, Dr. More and I should have liked on this occasion to speak of the great and often repeated kindness and thoughtfulness toward us personally, but so many are present here who undoubtedly feel the same way and who had the same experience. We must therefore give them mute thanks with our hearts. Let us, before leaving this sacred place, remain here for a moment in silence.

WOMEN'S AUXILIARY

MRS. A. C. BAKER, Fergus Falls, *President*
MRS. E. V. GOLTZ, 2259 Summit Avenue,
Saint Paul, *Publicity Chairman*

STATE BOARD MEETING

Members of the State Board of the Women's Auxiliary to the Minnesota State Medical Association held their first meeting of the year Thursday, October 12, in the Women's City Club, Saint Paul. Mrs. C. C. Chatterton of Saint Paul was the social chairman. The business meeting, which began at 10 a. m., was presided over by the state president, Mrs. A. C. Baker of Fergus Falls. Mrs. R. J. Joweski of Stillwater, recording secretary, read the report of the June convention which was held in Minneapolis. The Public Relations chairman, Mrs. A. F. Branta of Willmar, presented plans for the coming year. Other reports were heard from Mrs. M. A. Nicholson, president-elect and organization chairman; Mrs. S. S. Hesselgrave of Saint Paul, Archives chairman; Mrs. W. W. Will of Bertha, who reported on Hygeia; Mrs. J. A. Thabes, Sr., of Brainerd, Health Education; and Mrs. Joseph Gaida of St. Cloud, the state historian.

The following county presidents were present and gave reports: Mrs. E. Mariette, Hennepin County; Mrs. Harry Ghent, Ramsey County; Mrs. J. S. Cosgriff, Renville County; Mrs. Neil S. Dungay, Rice County; Mrs. Thomas Young, St. Louis County; Mrs. T. N. Flemming, Stearns-Benton; and Mrs. E. S. Boleyn, Washington County.

At a luncheon following the meeting Dr. W. A. Coventry of Duluth was the guest speaker. Thirty-two members were in attendance.

Hennepin County

Members of the Philanthropic Committee of the Women's Auxiliary to the Hennepin County Medical Society, who are making plans for the annual sale of articles for the tuberculous patients at Glen Lake Sanatorium, are Mrs. W. F. McGandy, Mrs. A. L. Hamel, Mrs. H. B. Sweetser, Mrs. R. F. Erickson, Mrs. Walter H. Fink and Mrs. F. B. Mach. The entire proceeds of the sale are returned to the patients who make the articles. The sale was held November 16, 17, and 18 at Dayton's.

Ramsey County

The Women's Auxiliary to the Ramsey County Medical Society held its first meeting of the season Monday, October 23, at the country home of Dr. and Mrs. A. Hoff, Turtle Lake. Mrs. Harry Ghent, the president, presided. After a short business meeting, a talk on "Bells" was given by Mrs. Schuyler Woodhull of Minneapolis. A social hour followed and tea was served.

Mrs. E. M. Hammes, Mrs. H. P. Ritchie and Mrs. Edward Schons, former presidents of the Minnesota State Medical Auxiliary, and Mrs. W. H. Hengstler and Mrs. A. E. Nichols, past presidents of the Ramsey County Medical Auxiliary, presided at the tea table.

Newly elected officers of the Ramsey County Medical Auxiliary are: President, Mrs. C. Harry Ghent; president-elect, Mrs. L. G. Dack; vice president, Mrs. F. J. Plondke; second vice president, Mrs. R. B. Schoch; recording secretary, Mrs. C. W. Wasa; corresponding secretary, Mrs. J. Allan Wilson; treasurer, Mrs. Mark E. Ryan; auditor, Mrs. A. E. Nichols.

The Ways and Means Committee of the Ramsey County Medical Auxiliary gave a buffet dinner at the Lowry Hotel Grand Ballroom on Monday evening, November 20, for husbands and guests. Members of the cast in "The Dream of a Clown," the musical revue which the Auxiliary sponsored last December, also attended the dinner. A surprise program in the form of an all male cabaret offered great amusement to those present.

The Ramsey County Medical Auxiliary has recently paid for the remodeling and redecorating of the kitchen at the Children's Home Society, a non-sectarian home for under-privileged children in Saint Paul.

Washington County

The Washington County Medical Auxiliary met at the home of Mrs. J. M. Haines on Tuesday, October 10. The afternoon was devoted to business, sociability and sewing for the Lake View Memorial Hospital. There were twelve members present.

MEDICAL ECONOMICS

Edited by the Committee on Medical Economics
of the

Minnesota State Medical Association
W. F. Braasch, M.D., Chairman

A NEW AUXILIARY TO MEDICAL PROGRESS

Organized medicine assailed by federal authorities and social reformers is so situated that it is difficult to defend itself. Continued propaganda by these powerful opponents has undoubtedly had its effect on a considerable element of our population.

We physicians realize that the position of American Medicine needs no defense and if left alone that we could solve the problems of medical distribution. We believe that we have the confidence of most of the intelligent and informed members of society. Nevertheless, there is a determined movement on foot, largely political, which threatens to wrest control of medical care from our hands and place it under federal influence.

Combining Forces

The American Medical Association cannot organize its forces to fight back; it has neither the funds nor can it employ methods necessary to contend successfully with its opponents.

In order to carry on it has become necessary to form an auxiliary body, including a group of influential laymen and interested friends of medicine. With the active support of their combined forces and the financial aid of this group, it is hoped that American Medicine can defend its independence and continue its march of progress.

For Supportive Action

The new institution which has been formed will be known as the *National Physicians' Committee for the Extension*

of Medical Service. Its officers and the members of the Executive and Central Committees are men who have long been associated in the loyal support of the American Medical Association. The objectives are in no way antagonistic to or critical of the policies of the American Medical Association. In fact, its function is purely to preserve a supportive line of action which the parent organization cannot assume. It will take over many of the activities of the old Gannett Subcommittee for Free Enterprise in Medicine, which accomplished so much in the opposition to the late lamented Wagner Health Bill.

Objectives

The objectives of the new committee are as follows:

1. To make the public thoroughly familiar with the glorious record and achievements of American Medicine;
2. To provide for the widest possible distribution of efficient medical care;
3. To prevent the adoption of new Health Bills embodying federal control of medical care which appear to be imminent in the next Congress, and
4. To insist on coöperation with the medical profession in the distribution of federal funds which may be justified by local needs of medical care.

Minnesota to Assist

A National Committee is being organized in Minnesota and members of our State Medical Association will be asked to support its activities. —W.F.B.

WAR AND MEDICINE

Now that the neutrality bill is on the statute books and the sound of European guns is somewhat less deafening in official ears, will the Wagner bill assume its former importance on the Washington stage?

Answers to that question differ somewhat depending upon the source of information.

It is of interest to note that administration officials, including Secretary-of-Labor Perkins, omitted no opportunity to point to a distressing lack of health facilities and medical care in the United States for the benefit of state and provincial health officers who met in Washington recently. Secretary Perkins herself was clearly interested in the establishment of medical service as one of the Social Security Aids. Another amendment providing for it appeared certain to be introduced in the next Congress.

Congress Pre-occupied

Other reports from sources quite close to congressional leaders in both houses of Congress indicate that the Wagner bill or a similar measure would undoubtedly pass both houses if it could be put to a vote now. Most of the senators and congressmen believe there is a need for it, according to this report. Other things being equal, they would undoubtedly vote for a sweeping health bill.

But all other things are not equal. It is more than likely, according to this prediction, that Congress will continue to be pre-occupied with international problems and America's precarious neutrality. That being the case, it is going to be difficult to get attention for any internal program and there will be small interest and less enthusiasm for any radical departure from the present Social Security act.

Emergency Dictatorship?

One possibility is sensed by all who visit Washington. If the United States should be drawn into war—and returning congressmen do not dismiss that possibility lightly—then medicine will be one of the first departments of civil life to be subjected to emergency dictatorship. Members of the Medical Reserve Corps and all of the younger physicians will be conscripted for war service. Medical services at home will be proportionately demoralized and those who remain will be under emergency orders to go where they are needed most.

The dislocation of medical services will be far greater in case of a new war than it was in 1917 because War Department plans for the draft are said to be far more complete and far reaching. They will, in all probability, be put into effect immediately. The effect upon civilian services will be equally immediate and disastrous, unless the government steps in.

The question is: will the government step out? To some observers, it seems unlikely that physicians will regain complete freedom of practice when the emergency is over.

In any case, there are no ready made answers to the questions that the current crisis will present to the world. One thing alone is certain: Alertness and levelheaded leadership are needed among American doctors.

**FARM SECURITY PLAN REJECTED
IN WRIGHT COUNTY**

Adequate facilities are available for medical care of Farm Security Administration clients in Wright County under the existing plan for medical care of relief clients. There is no need at present for a coöperative contract, so-called, to be financed by the Farm Security Administration for these Wright county clients.

This decision was recently reached by the Wright County Medical Society after extensive and careful consideration of a proposal for such a plan made by Administration representatives in Wright County.

In considering the proposal, the county medical society was, of course, free to make its own decision, basing its findings solely upon conditions in its own community. The Sub-Committee on Low Income and Indigent Problems of the state medical association's Medical Economics Committee had previously considered advisability of similar contracts from a state-wide point of view and had concluded that no need exists at the present time for a state-wide plan for Farm Security Clients; but the action of the state committee is not binding upon individual counties which may wish to organize, providing the plan is ethical and meets with the approval of the local county medical society.

No Definite Need

Wright County findings were as follows:

1. That no definite need was established for such a plan in Wright County.

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2. The doubtful number of clients that could be interested in such a plan.
3. Small number of clients in Wright County, even if all should become interested in the plan.
4. County Society members are satisfied with the present set-up for care of poor within the county at this time.
5. That all inquiry and evidence indicated that all poor within the county, applying for medical or surgical service, received it through the present available sources, or gratuitously by members of the County Society.
6. That the plans advanced, indicated an increase of book work, and keeping of records and making of reports, out of all proportion to any benefit that might be expected in the way of increased income or betterment of service to clients.

PHYSICIANS WILL APPLAUD

If the state and territorial health officers are heeded, any future expansion of tax supported Industrial Hygiene services will be developed in a manner to provide immediate or ultimate responsibility for direction of the program by the State Departments of Health in coöperation with the United States Public Health Service.

A resolution to this effect was passed during recent deliberations in Washington of the health officers' association. It was the response of the health officers to pressure brought from time to time to remove Industrial Hygiene from health department auspices and give to the Department of Labor.

All physicians will applaud retention of the Industrial Hygiene program with the regular official health services of each state. Emphasis will thus continue to be placed upon scientific investigation under qualified direction and also upon coöperation with practicing physicians.

"Proof of Death"

The health officers also approved the plan submitted by the Social Security Board which calls for the local registrar, or other person authorized under state law or under regulations of the State Department of Health to receive certificates of death, to send each "proof of death" direct to the Social Security Board. The importance of this action arises from the fact that

without such proofs of death benefit payments will continue to be paid after holders of Social Security account numbers are deceased. It is expected that a large part of the population will eventually hold Social Security numbers and each death will be reported immediately to the Social Security Board.

LET IT BE RESOLVED

(Monthly Editorial Prepared by the Medical Advisory Committee)

The year 1939 has been a most interesting one in the work of your Medical Advisory Committee. Unusual cases have brought unusual situations in certain localities in the state. They have affected doctors in their attitude toward each other, toward lawyers in compensation and other insurance-involved litigation, toward political and state subdivisions attempting to control medical care.

With 1940 in the offing, would it not be well for each man in our Association to ask himself a few questions like the following:

1. Have I in any way by act or deed started a malpractice case against a fellow practitioner?
2. Have I practiced the same consistent and honest medicine and surgery that I would have wanted to be used on a member of my own family under the same circumstances?
3. Have I connived with any legal advisor for the purpose of putting over a case contrary to the ethics of the A.M.A. and good medical practice?
4. Have I in court given unbiased and fair opinions when called as a witness, thereby gaining the admiration and good will of the court?
5. And last, have I at all times held the well being of the whole medical profession paramount to my individual desires?

When these questions have been honestly answered, let us begin the new year with a resolution to put American medicine on a higher plane than ever before.

Your Committee believes thoroughly that the evils within the profession can be most easily eliminated by consistent work with individuals.

B. J. B.

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MINNESOTA STATE BOARD OF MEDICAL EXAMINERS

Julian F. Dubois, M.D., Secretary

Saint Paul Representative of Viavi Products Convicted by Jury of Practicing Healing Without Basic Science Certificate

Re. State of Minnesota vs. Ruth A. C. Sherman.
Re. State of Minnesota vs. Anna E. Miller and Ruth A. Sherman.
Re. St. Paul Viavi Company.

A jury in the District Court of Ramsey County, on October 27, 1939, convicted Ruth A. C. Sherman, 63 years of age, of the crime of practicing healing without a basic science certificate. Mrs. Sherman, manager of the St. Paul Viavi Company, had been indicted by the grand jury of Ramsey County on October 9, 1939, on a charge of violating the basic science law in connection with the sale of Viavi products totaling \$32.25, to one Edward Farrell of St. Paul, who was suffering from a detached retina. The trial commenced on October 23, and the case was submitted to the jury at 6:30 p. m. on October 27. The jury retired for dinner and returned with their verdict at 10:15 p. m., deliberating less than two hours before finding the defendant guilty. The jury was composed of four women and eight men. Sentence was pronounced on October 30, 1939, by the Honorable Gustavus Loewinger, Judge of the District Court, who presided at the trial, and in imposing sentence sharply denounced the sale of Viavi products as a menace to the community and an imposition on the public. Judge Loewinger also pointed out that the evidence clearly indicated that Viavi products, while being sold for large sums of money, were worth only a mere fraction of their sales price, and in addition were of doubtful value. Judge Loewinger upon being assured by Mrs. Sherman, in open court, through her legal counsel, Mr. Carl W. Cummins and Mr. Frank Drill, that Mrs. Sherman would refrain, in every manner, from the sale of Viavi products in the State of Minnesota, imposed a sentence of three months in the Women's Reformatory at Shakopee, Minnesota, and placed the defendant on probation for one year under the supervision of Mr. John Doyle, probation officer for Ramsey County. Counsel for the defendant made a plea to the Court to impose a fine instead of a jail sentence, but his plea was successfully opposed by Mr. James F. Lynch, County Attorney, on the grounds that imposing a fine would enable the Viavi Company in Chicago or San Francisco to pay the fine and the defendant to remain in the Viavi business.

At the same session of Court, Anna E. Miller, 55 years of age, who also engaged in the sale of Viavi products in St. Paul, entered a plea of guilty to an information charging her with the crime of practicing healing without a basic science certificate in connection with the sale of Viavi products, and upon similar assurance being given to the Court that the defendant, Miller, would disassociate herself entirely from Viavi products, was sentenced to a term of one month in the Women's Reformatory at Shakopee, and was likewise placed upon probation for one year under similar terms. It was brought out in the questioning of the defendant, Miller, that she and the defendant, Sherman, had obtained in excess of \$800.00 from one St. Paul family, over a period of years, for Viavi products.

Defendants, Sherman and Miller, were arrested on June 15, 1939, by detectives of the St. Paul Police Department following the signing of a complaint against the defendants by Mr. Brisson on behalf of the Minnesota State Board of Medical Examiners. Through the splendid cooperation of Mr. R. A. Trovaten, Commissioner of the State Department of Agriculture,

Dairy and Food, and Mr. Henry J. Hoffman, chemist, and Mr. W. C. Johnson, assistant chemist in the chemical laboratory of that Department, the attention of the Minnesota State Board of Medical Examiners was called, on June 13, 1939, to the obtaining of \$390.70 by the defendants, Sherman and Miller, for Viavi products, from Mr. and Mrs. William Arndt and their daughter, who reside at 1538 Thomas St., St. Paul. The Arndts, upon the representation made by the defendant, Miller, that these Viavi products would restore the health of Mrs. Arndt and the daughter, paid this large sum of money to the defendant, Miller, who in turn secured the products from the defendant, Sherman. After faithfully following the directions given by the defendants, for nearly one year, the Arndts became discouraged because of no improvement in their health, and took the Viavi products consisting of Viavi Royal Tonic, Viavi Cerate and Viavi Tablets, to the chemical laboratory of the State Department of Agriculture, Dairy and Food, for a chemical analysis. Messrs. Trovaten, Hoffman and Johnson, upon learning of the large sum of money paid by the Arndts for such a small amount of medicine, promptly referred the matter to the Minnesota State Board of Medical Examiners for an investigation, leading to the arrest of both women two days later. Following their arrest, both defendants demanded a preliminary hearing, which was held on July 7, 1939, before Judge Robert V. Rensch, recently appointed by Governor Stassen to the Municipal Court of St. Paul. The evidence at the preliminary hearing disclosed that of the \$390.70 obtained from the Arndt family, one-third, or \$130.23, went to the defendant, Miller, one-third, or \$130.23 went to the defendant, Sherman, and a like amount to the Eastern Viavi Company at Chicago, Illinois, from whom Mrs. Sherman obtained the Viavi products. At the conclusion of the preliminary hearing Judge Rensch denied a motion by counsel for the defendants to dismiss the cases and emphatically stated that the Court could not possibly dismiss the cases in view of the testimony by the Arndt family and held both defendants to the District Court under bond of \$1,000.00 each.

At the trial in the District Court of the defendant, Sherman, the State introduced evidence that Mrs. Sherman represented Viavi as "the means of restoring health." One of her professional cards appearing below:

302 Oppenheim Bldg. St. Paul, Minn.
VI AVI
THE MEANS OF RESTORING HEALTH
R. A. C. SHERMAN FOR APPOINTMENT
GEN. MGR. TEL. CE. 8952—MI. 3986

In addition to the Farrell case, the State introduced evidence to show that Mrs. Sherman had made similar representations to other persons who were sick, and that she had obtained various sums of money for Viavi products. One witness testified that Mrs. Sherman had represented to him and his wife, that Viavi products would cure his wife of heart trouble and that they purchased Viavi products to the extent of \$64.05. This witness also testified that his wife died in May of this year, notwithstanding the Viavi products. Another witness testified for the State that he had paid Mrs. Sherman nearly \$50.00 for Viavi products for his daughter who was suffering from chronic bronchitis. It is interesting to note that at the trial, one Dr. Robert E. Law, 51 years of age, testified as a witness for the defendant, Sherman, and stated that he was a graduate physician and surgeon, and that he was vice president of the Viavi Company at San Francisco, California. While this witness was on the stand, he admitted upon cross examination that the United States Government had seized a shipment of Viavi products in the State of Colorado, and that the Government had sued out a libel proceeding in the United States Dis-

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trict Court, alleging that the labeling of the products contained statements representing that the products possessed curative and therapeutic properties which, in fact, they did not possess. It was also disclosed that on May 19, 1932, a United States District Court Judge, in Colorado, made an order for the condemnation and forfeiture of the Viavi products and ordered that they be destroyed by the United States Marshal. Dr. Law also testified that the active head of the Viavi Company at San Francisco is his father, Dr. Hartland Law, whose age he gave as 81. The Court was also advised that a representative of the Eastern Viavi Company of Chicago, Illinois, was in the court room throughout the trial. The records of the St. Paul Viavi Company disclosed that in the month of January, 1939, Viavi products totaling \$650.00 were sold through that office and varying amounts for other months. It was also brought out that the Viavi Company has a representative in Minneapolis and also in Duluth.

While the Minnesota State Board of Medical Examiners is proud of the small part that it played in these cases, it feels that the major credit for the splendid results achieved, is due to the most capable handling of the cases by Mr. James F. Lynch, newly appointed County Attorney of Ramsey County, and the most serious and patient consideration given to the cases by the grand jury of Ramsey County, Judge Gustavus Loevinger, who presided at the trial, and the trial jury. Judge Loevinger publicly commended the grand jury, the trial jury and Mr. Lynch for what they did in these cases, and the Medical Board wishes to join in that commendation, and also to acknowledge the prompt and worth while coöperation of Messrs. Trovatten, Hoffmann and Johnson.

Court Dismisses Suit by Austin Physician and Fraternal Order of Eagles Against the Minnesota State Board of Medical Examiners

Re: Fisch, et al. vs. Sivertsen, et al.

On October 21, 1939, the Honorable Norman E. Peterson, Judge of the District Court for Mower County, made an order dismissing the lawsuit instituted by Herbert Matthew Fisch, M.D., of Austin, Minnesota, and Fraternal Order of Eagles, Lookout Aerie No. 703, at Austin, Minnesota, against the Minnesota State Board of Medical Examiners. Judge Peterson ordered a stay of 40 days in order to permit the plaintiffs to appeal to the Supreme Court of Minnesota, if they so desire.

This lawsuit was instituted by Dr. Fisch and Fraternal Order of Eagles following a hearing held by the Minnesota State Board of Medical Examiners on July 6, 1939, and following a ruling by the Honorable J. A. A. Burnquist, Attorney General of the State of Minnesota, and Mr. John A. Weeks, Assistant Attorney General, that the furnishing of medical care by the Fraternal Order of Eagles at Austin, Minnesota, is a violation of the laws of the State of Minnesota, particularly those laws relating to the practice of healing and the practice of medicine. The Attorney General also ruled that Dr. Fisch, and any other doctor, who is a party to the operation of such a plan, subjects himself to disciplinary proceedings in the form of a suspension or revocation of his license as a physician and surgeon. The purpose of the lawsuit was to obtain an injunction restraining the Minnesota State Board of Medical Examiners from interfering with the operation of the plan and from taking any steps to suspend or revoke the license held by Dr. Fisch. The lawsuit was also directed against the members of the Mower County Medical Society, but the plaintiffs dismissed their case against the Mower County Medical Society when the case was called for hearing in Court.

The plan pursued by the Eagles Lodge at Austin, is briefly as follows: The various members of the Eagles Lodge pay \$12.00 per year in dues to the local aerie or lodge. Out of this amount the sum of \$4.00 per year per member is allocated for medical care and this fee is split equally between Dr. Fisch, a duly licensed physician and surgeon, and Dr. Leon C. Nicholsen, a duly licensed osteopath, irrespective of which one attends the patient. The Eagles Lodge at Austin has about 1,200 members and while the constitution of the Lodge provides for the payment of \$2.00 per year per member for medical care, this figure has been increased by the local aerie. The legality of this plan was questioned by the Medical Board in 1937, following which, legal counsel for the Grand Aerie of Eagles appeared before the Board and advised the Board that despite the fact that the furnishing of medical care was advantageous to the Fraternal Order of Eagles from the standpoint of obtaining members, there were certain objectionable features to the plan, and that while they would not concede that the plan was unlawful, they would terminate the plan if they were given until June 1, 1938, in order to work out other suitable benefits for the members, such as, an increase in the cash sick benefit paid by the Aerie. The Medical Board was also assured that no new aeries would be organized in Minnesota under the old plan and accordingly, the Board passed the matter for the time being. Several of the aeries thereafter voluntarily discontinued the operation of the plan, including aeries in St. Paul and Minneapolis. However, the aerie at Austin, and in two or three other communities in Minnesota, continued to furnish medical care under such a plan, which resulted in the hearing held before the Board on July 6, this year, and the subsequent ruling by the Attorney General of Minnesota. The Supreme Court of Minnesota has ruled that neither a corporation, nor a lay person, can practice law, directly or indirectly, through the medium of employing a licensed attorney to practice law for others for the benefit or profit of the corporation or layman. The Supreme Court of Minnesota stated:

"We are just as firmly convinced that it is improper and contrary to statute and public policy for a corporation or lay man to practice medicine in the same way."

The Supreme Court of Minnesota also stated:

"What the law intends is that the patient shall be the patient of the licensed physician, not of a corporation or layman. The obligations and duties of the physician demand no less. There is no place for a middleman."

Under the plan pursued by the Fraternal Order of Eagles the aerie physician is obligated to furnish medical care, not only to the member, but to his entire family.

Saint Paul Man Sentenced to Three-Year Prison Term for Fraud in Obtaining Narcotic Prescriptions

Re: State of Minnesota vs. Morris William Herman, alias William Herman, alias William Stearn, alias William Sterns, alias William Gordon.

On November 15, 1939, Morris William Herman, 28 years of age, entered a plea of guilty to an information charging him with a violation of the Minnesota Uniform Narcotic Act, and was sentenced by the Honorable Gustavus Loevinger of the District Court of Ramsey County, to a term of not less than two, and not more than three, years at hard labor in the State Reformatory at St. Cloud. The defendant was arrested on November 2, 1939, in the office of a St. Paul physician from whom he had previously obtained two prescriptions for a preparation containing narcotics, through the use of a false name and a fictitious address. The investigation leading up to the

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defendant's arrest was conducted by the Federal Bureau of Narcotics and the St. Paul Police Department. Upon being questioned by Judge Loewinger at the time of sentence, the defendant stated to the Court that none of the physicians had made any examination of him to determine whether or not it was necessary to prescribe a preparation containing a derivative of opium. In addition, the prescriptions disclose that one St. Paul physician wrote for the defendant at two different addresses within a period of four days. The defendant has a long criminal record dating back to 1928. On December 18, 1928, he was sentenced in the District Court of Ramsey County to a term of not to exceed five years in the State Reformatory at St. Cloud on a charge of assault with intent to commit rape. In March, 1934, he pleaded guilty in the United States District Court at St. Paul, to an indictment charging him with possessing an unregistered still. At that time he was sentenced to two years in the United States Penitentiary at Leavenworth and fined \$600.00. He served the sentence at St. Cloud, and he also served the sentence at Leavenworth. Between November 28, 1937, and June 22, 1939, he was convicted nine times in the Municipal Court in St. Paul on charges of drunkenness.

Herman obtained his first narcotic prescription from a St. Paul physician on October 14, 1939, by giving the name of William Sterns, 422 Como Avenue. The prescription called for one ounce of laudanum, $1\frac{1}{2}$ ounces of olive oil and $\frac{1}{2}$ ounce of turpentine. The prescription directed that the preparation be applied to the back as needed. The physician who wrote this prescription states that he made a partial examination of the defendant, and also made inquiry of a pharmacist to determine if it was possible to separate the laudanum from the olive oil and turpentine. Thereafter Herman obtained 19 additional prescriptions from eight St. Paul physicians, including the first physician he went to, or a total of twenty prescriptions in eighteen days. All of the prescriptions called for the same ingredients with the exception that in two of the prescriptions the amount of laudanum, olive oil and turpentine was doubled. Herman used the following names in obtaining the prescriptions: William Herman, William Stearn, William Sterns and William Gordon. In addition to the address of 422 Como Avenue, he used the following addresses: 473 Como Avenue, 66 Summit Avenue and the Empress Hotel. There is no such address as 422 Como Avenue, while 473 Como Avenue is the address of a family who have no acquaintance whatsoever with the defendant. Defendant admitted that he never had lived at 66 Summit Avenue and had only been at the Empress Hotel on one or two occasions. He stated to the Court that the address of his parents was 203 E. Indiana St., St. Paul. A number of the physicians frankly admitted that they made no examination of the defendant and they have also expressed their regrets at being so careless in the prescribing of narcotics. The usual pretext advanced by Herman to obtain a prescription was to advise the physician that his own doctor was out of the city and that this preparation was the only one that gave his back any relief. On being questioned by Judge Loewinger as to what disposition he made of the preparation after obtaining it at the drug store, Herman rather vaguely described it as a "Dick Evans" to whom he delivered the preparation at a pool hall in the basement of the Hamm Building. The facts indicate that Herman is not an addict inasmuch as he was in jail for 14 days prior to being sentenced and he showed no withdrawal symptoms.

Agents of the Federal Bureau of Narcotics state that it is a simple matter to extract the tincture of opium from this preparation, and undoubtedly the tincture of opium is diverted in an unlawful manner to a person not entitled to receive it. The facts indicate extreme carelessness on the part of the physicians in the issuing of these prescriptions. It is a criminal offense

for a physician to prescribe, administer or dispense any of the derivatives of opium, except in the bona fide practice of medicine. The Supreme Court of the United States has held that the test is the presence or absence of good faith on the part of the attending physician. Good faith can hardly be said to be present unless a patient is given a thorough medical examination before the physician prescribes any narcotics, irrespective of whether they are to be used internally or externally. In the second place, a physician should be extremely careful when a patient comes into his office requesting a prescription containing a derivative of opium, notwithstanding any pretext given by the patient about his own physician being out of the city. The medical profession should not undertake to decide whether or not a narcotic can be extracted from a preparation or diverted to an unlawful use. If they will confine their efforts to examining the patient to determine whether or not he needs such a narcotic preparation, it will then be unnecessary for the medical profession to assume the responsibility for any unlawful diversion of narcotics. Lastly, under the laws of the State of Minnesota, a violation of the Federal or State Narcotic Laws is a ground for the suspension or revocation of a physician's license to practice medicine. The State Board of Medical Examiners has repeatedly published warnings about the necessity of a physician refusing to write prescriptions or to furnish narcotics to persons who are not entitled to such drugs. Nevertheless, despite all the publicity that has been given on the subject, the medical profession permits themselves to be victimized and unless there is an improvement in this respect it will result in a criminal prosecution against the physicians and the suspension or revocation of their license to practice medicine.

Ramsey County District Court Upholds Five Year Suspension of Lake City Physician's License

In the Matter of the Revocation of the License of Gottfried Schmidt, M.D.

On November 6, 1939, the Honorable Carlton McNally, Judge of the District Court of Ramsey County, made an order affirming the five-year suspension of the license of Gottfried Schmidt, M.D., of Lake City, Minnesota. Dr. Schmidt's license was suspended on December 16, 1938, by the Minnesota State Board of Medical Examiners following a hearing in which Dr. Schmidt was found guilty of advertising "professional superiority to, and greater skill than, that possessed by fellow physicians and surgeons," and of "conduct unbecoming a person licensed to practice medicine in the State of Minnesota and detrimental to the best interests of the public." Judge McNally in his order stated: "It is the opinion of the Court that the action of the Board of Medical Examiners was neither arbitrary, oppressive nor unreasonable, and that the evidence adduced before the State Board afforded a reasonable and substantial basis for the order made by the Board suspending Relator's license to practice medicine for a period of five years from December 16, 1938."

The testimony before the Medical Board showed that Dr. Schmidt represented to patients that he was able to diagnose diseases by having the patient place sputum on a piece of paper, which was then placed on the abdomen of either the patient or a woman employed by Dr. Schmidt in his office at Lake City, and then having the patient, or the person employed for that purpose, hold various medicines in their hand. The testimony also showed that Dr. Schmidt had represented to patients that he had a machine in his office by which he could broadcast treatments to patients without the necessity of the patients coming to his office. Letters were also received in evidence,

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written by Dr. Schmidt to various patients, indicating that the patients were afflicted with aluminum poisoning, Avian Tuberculosis and various other ailments. Dr. Schmidt was warned by the Medical Board in 1936, to desist from these practices. However, he paid no attention to the warning and a citation was served upon him which resulted in the hearing before the Medical Board and the suspension of his license. Thereafter Dr. Schmidt took an appeal to the District Court of Ramsey County, and the matter was heard by Judge McNally on October 21, 1939. The records of the Medical Board show that Dr. Schmidt was born in Minnesota in 1871, and graduated in 1903, in medicine from the University of Minnesota.

License of Dassel Physician Suspended for Three-Year Term Because of Use of Narcotic Drugs

In the Matter of the Revocation of the License of Stephane Dulude, M.D.

On November 3, 1939, the Minnesota State Board of Medical Examiners suspended, for a period of three years, the license to practice medicine held by Stephane Dulude, M.D., of Dassel, Minnesota. Dr. Dulude was served with a citation in September requiring him to show cause why his license as a physician and surgeon should not be revoked because of habitual indulgence in the use of drugs. Dr. Dulude was advised, at that time, to surrender his narcotic stamp tax to the Collector of Internal Revenue and his narcotic government order book to the District Supervisor of the Narcotic Bureau at Minneapolis. A similar request had been made of Dr. Dulude by agents of the Narcotic Bureau. However, Dr. Dulude refused to do either. Dr. Dulude was also instructed to immediately place himself in a suitable hospital for treatment by a licensed physician and surgeon. However, he made no attempt to be hospitalized until October 1st, and then for only a period of three weeks. The records of the Bureau of Narcotics disclose that on May 4, 1939, when the government inspection was made, Dr. Dulude was short approximately 3,500 $\frac{1}{4}$ -grain morphine sulphate hypodermic tablets, 3,500 $\frac{1}{2}$ -grain morphine sulphate hypodermic tablets and 3,500 $\frac{3}{4}$ -grain morphine sulphate hypodermic tablets, or approximately 1,895 full grains of morphine sulphate hypodermic tablets. The investigation made by the Minnesota State Board of Medical Examiners disclosed that from the date of the government investigation on May 4, 1939, up to August 24, 1939, Dr. Dulude continued to purchase enormous amounts of narcotics, his orders totaling 2,400 $\frac{1}{4}$ -grain morphine sulphate hypodermic tablets, 1,200 $\frac{1}{2}$ -grain morphine sulphate hypodermic tablets and 1,200 $\frac{3}{4}$ -grain morphine sulphate hypodermic tablets, or a total of 950 full grains of morphine sulphate hypodermic tablets in a period of less than four months, and despite the fact that the government was then investigating his practice.

License of Willmar Physician Revoked Following Conviction for Criminal Abortion

In the Matter of the Revocation of the License of Iver S. Benson, M.D.

At the regular meeting of the Minnesota State Board of Medical Examiners held in St. Paul on November 3, 1939, the license to practice medicine formerly held by Iver S. Benson, M.D., of Willmar, Minnesota, was revoked. Dr. Benson had been previously served with a citation requiring him to show cause why his license as a physician and surgeon should not be revoked because of the procuring, aiding and abetting, on his part, of criminal abortions. Dr. Benson is confined in the State Reformatory at St. Cloud, Minnesota, follow-

ing his plea of guilty on September 28, 1939, in the District Court at Willmar, Minnesota, to an information charging him with the crime of abortion. Dr. Benson is serving a term of not to exceed four years, following the death on August 15, 1939, of a young married woman from Montevideo, Minnesota.

List of Physicians Licensed by the Minnesota State Board of Medical Examiners on November 3, 1939

October Examination

Anderson, Charles Leonard—U. of Minn., M.B. 1939, M.D. 1939, Proctor.
Brown, George Emerson—U. of Minn., M.B. 1938, M.D. 1939, Rochester.
Brown, Joe Robert—U. of Iowa, M.D. 1937, Rochester.
Berkland, Carl Edwin—Johns Hopkins, M.D. 1935, St. Paul.
Cowan, Jack Thomas—Northwestern, M.B. 1938, M.D. 1939, St. Paul.
Donald, Charles Johnson, Jr.—Tulane U., M.D. 1936, Rochester.
Elliott, James Francis—U. of Alberta, M.D. 1936, Rochester.
Gambill, Earl Edward—U. of Pa., M.D. 1935, Rochester.
Golden, Robert Fred—Geo. Wash. U., M.D. 1937, Rochester.
Hall, Howard—U. of Minn., M.B. 1938, Minneapolis.
Heilman, Charles—Northwestern, M.B. 1934, M.D. 1935, Rochester.
Hoidale, Porter Maderia—U. of Minn., M.B. 1939, St. Paul.
Hughes, John Davis—U. of Tenn., M.D. 1935, Rochester.
Hughes, Theodore James—McGill U., M.D. 1937, Rochester.
Hummer, George John—Rush Med. Col., M.D. 1937, Rochester.
Hunt, Robert Sellen—Northwestern, M.D. 1938, Fairmont.
Johnson, Clive Roland—Rush Med. Col., M.D. 1937, Rochester.
Kallestad, Leonard Lester—U. of Minn., M.B. 1938, M.D. 1939, Minneapolis.
Knudson, Alvin Bernt Clifford—U. of Minn., M.B. 1938, M.D. 1939, Minneapolis.
Kvarnes, Robert Gordon—U. of Minn., M.B. 1938, Minneapolis.
Lien, Richard J.—U. of Minn., M.D. 1937, Rochester.
Lipscomb, Paul Rogers—Med. Col. of S. Car., M.D. 1938, Rochester.
Mader, James Wilson, Jr.—U. of Pa., M.D. 1937, Rochester.
Mattson, Albert Donald—U. of Minn., M.B. 1939, Duluth.
Mears, Robert Fuller—U. of Minn., M.B. 1938, Minneapolis.
Pattison, Donald Haggart—U. of Wis., M.D. 1936, Rochester.
Pearson, Clarence Coplyn—U. of Texas, M.D. 1937, Rochester.
Peterson, Wendell Gladstone—U. of Minn., M.B. 1938, M.D. 1939, Rochester.
Poppe, Frederick Paul—U. of Minn., M.B. 1938, Minneapolis.
Power, Harry Waldo—Northwestern, M.B. 1938, M.D. 1939, Saint Paul.
Quick, Edwin Danford—U. of Minn., M.B. 1936, M.D. 1937, Rochester.
Schmidt, Mary Alice—U. of Minn., M.B. 1938, M.D. 1939, Minneapolis.
Shelden, James Thomas—U. of Minn., M.B. 1937, M.D. 1938, Rochester.

(Continued on Page 871)

OF GENERAL INTEREST

Dr. C. H. Clark, formerly of Pipestone, is now located in Rushmore.

Dr. Fred H. Wiechman, formerly of Cass Lake, has opened offices in Montgomery. Dr. Wiechman will make his residence in New Prague.

Dr. L. F. Wasson who has been associated with Dr. E. Haberman in the practice of medicine in Osakis, has moved to Alexandria where he will be associated with Dr. A. D. Haskell.

Drs. Earl C. Henrikson, Herman Michael Koller and Louis Robert Koller of Minneapolis were among those who were awarded fellowships in the American College of Surgeons recently.

Dr. M. B. Dahle, formerly of Warroad, has opened an office in Glenwood. Dr. Dahle is a graduate of Rush Medical College, served as an interne in the Asbury Hospital, Minneapolis and did surgical work in the Swedish Hospital, Minneapolis.

Dr. Edward P. Burch, Saint Paul, was married December 3, 1939, to Miss Conradiine Sanborn, daughter of Mr. Bruce W. Sanborn, Saint Paul. Dr. Burch is associated with his father, Dr. Frank E. Burch, in the practice of ophthalmology.

All physicians and surgeons in good standing are invited to attend the fourth assembly of the International College of Surgeons to be held at Venice, Florida, February 11-14, 1940. Inquiries may be addressed to Dr. Fred H. Albee, 57 West 57th Street, New York City.

Dr. Harry L. Plotke has opened offices in Little Falls. A graduate of the University of Minnesota Medical School in 1937, Dr. Plotke served his internship at Ancker Hospital, Saint Paul, and served a year at Minneapolis General Hospital. More recently he has served as a physician at the Cass Lake Indian Hospital.

Dr. Irvine McQuarrie, Professor of Pediatrics at the University Medical School, will sail December 15 from San Francisco with his wife and two daughters for Peking, China. He expects to spend six months as visiting professor of pediatrics at the Peking Union Medical College, which is operated by the Rockefeller Foundation. Dr. A. E. Hansen will be in charge of the pediatrics department during Dr. McQuarrie's absence.

The Minnesota Hospital Service Association rendering service in the Twin Cities, Duluth, Stillwater and Fergus Falls has a present enrollment of 300,000. Since the inauguration of the plan some 58,000 subscribers have been hospitalized and \$1,610,000 paid the hospitals for services rendered. The days of hospitalization allowed have been increased from twenty-one days for the first year to twenty-four days the second year, twenty-seven the third year and thirty days the fourth year. Coverage for dependents has increased from 25 to 50 per cent. Overhead costs have been kept at 10 to 11 per cent.

The Minnesota Department of Health announces the following changes in laboratory services:

The Kline exclusion test will be carried out on all blood specimens submitted for Wassermann tests. All

specimens showing positive or doubtful reactions will be subjected to the Kolmer-Wassermann and the Kline diagnostic tests. However, the Kolmer-Wassermann test will be done routinely on all specimens from children under ten years (cord blood excepted) and on spinal fluid.

Culture will replace animal inoculation for the detection of tubercle bacilli.

The Neufeld method will replace the mouse test for pneumonia typing, but pneumonia sputum will be examined for tubercle bacilli as formerly.

The Nobel Prize this year was awarded to Prof. Gerhard Domagk for his research with the drug sulfanilamide and its derivatives. Professor Domagk was born in Lagow, Germany, in 1895. Serving in the German army during the World War he received his medical degree from Kiel University. After doing research in pathology he became director of the Institute of Experimental Pathology in the I. G. Dye Works in Elberfeld. Late in 1932 Professor Domagk first demonstrated the curative effect of prontosil in streptococcus infections in mice. Clinical trial in human cases in the following two years proved its efficacy. In 1937 Professor Domagk received the Emil Fischer Medal, the highest award of the German Chemical Society, and in 1939 the Cameron prize of the University of Edinburgh, Scotland.

The Memorial Pilgrimage in honor of Drs. William J. and Charles H. Mayo to Rochester was carried out October 27, 1939, as arranged by the Council of the Minnesota State Medical Association.

Plummer Hall was filled with friends of the late Mayo brothers, many from the more remote areas of the state, to pay their homage. At the ceremony, presided over by Dr. George Earl, president of the State Association, Dr. E. L. Tuohy of Duluth, paid tribute to the lives and characters of Dr. Will and Dr. Charlie.

Following this gathering some three hundred in attendance proceeded in a line of automobiles a mile long to Oakwood Cemetery, where wreaths were placed upon the graves of the two brothers by Dr. Arnold Schwyzer and Dr. Charles W. More.

The addresses made on the occasion of the Pilgrimage appear elsewhere in this issue.

Distribution of Pneumonia Serum

Owing to lack of funds the distribution of pneumococcus anti-serum other than for Types I and II was discontinued July 1, 1939, on approval of the Minnesota State Board of Health. This matter had been taken up with the Councillors of the Minnesota State Medical Association at their meeting June 1, at which time the continuation of typing specimens for all thirty-two types of pneumococci and reporting on all types but furnishing serum for only Types I and II was approved. At the meeting of the State Board of Health, November 15, it was decided that, using federal funds, now available, the Division of Preventable Diseases would again distribute therapeutic pneumococcus anti-serum for all higher types as well as for Types I and II and continue twenty-four-hour typing service as usual. These funds may not last the entire season. However, the program as outlined above will be followed as long as funds permit.—A. J. CHESLEY, Executive Secretary, State Board of Health.

◆ REPORTS and ANNOUNCEMENTS ◆

MEDICAL BROADCAST FOR DECEMBER

The Minnesota State Medical Association Morning Health Service

The Minnesota State Medical Association broadcasts weekly at 11:00 o'clock every Saturday morning over Station WCCO, Minneapolis (810 kilocycles or 370.2 meters) and Station WLB, University of Minnesota (760 kilocycles or 395 meters).

Speakers: William A. O'Brien, M.D., Associate Professor of Pathology and Preventive Medicine, Medical School, University of Minnesota. The program for the month will be as follows:

- December 2—Pernicious Anemia.
- December 9—Iron Deficiency Anemia.
- December 16—Deficiency Disease.
- December 23—Streptococcal Infection.
- December 31—Care of the Teeth.

STATE MEETING

The honor of holding the first medical meeting ever staged in the fine new auditorium built and given to Rochester by the late Drs. William J. and Charles H. Mayo, goes by special invitation to the Minnesota State Medical Association.

The occasion is the 87th Annual Meeting of the Association which will be held in the new auditorium in Rochester, April 22, 23 and 24, 1940, with Council and House of Delegates meetings scheduled for Sunday, April 21, at the Kahler Hotel. The new building is situated in Mayo Park, within three blocks of the center of Rochester. It has a fine modern Arena, fully equipped, and a splendid theater. Surrounding it are the gardens and lawns of Mayo Park and nearby stands the bronze figure of the father of the great surgeons, Dr. William Worrall Mayo.

It is peculiarly appropriate that the Minnesota State Medical Association, which all three of these men served as president, should be the organization chosen to throw open the doors of the new building to medical colleagues of Minnesota and the Northwest.

Outlines of the scientific program for the occasion were drawn up at the first meeting of the Committee on Scientific Assembly, held under the chairmanship of Dr. B. S. Adams of Hibbing, president-elect of the association, on November 9.

Monday's program will be given over exclusively to clinics and round table luncheons conducted by members of the Mayo Clinic. An open house in the Auditorium Arena for all convention guests will climax the program of the Clinic on Monday night. Exhibits will remain open for this event and refreshments and entertainment will be provided.

Eight distinguished out-of-state guests have been invited by the committee and the special societies to address the Tuesday and Wednesday sessions. Other Minnesota speakers together with the guest speakers will conduct another series of round table luncheons on

Tuesday. The annual banquet of the association will be held Tuesday night at the Rochester State Hospital.

Physicians from all over the Northwest will be invited to attend the meeting.

WASHINGTON COUNTY

The Washington County Medical Society held its regular monthly meeting on October 10 at the Stillwater Club rooms. The guest speaker for the evening was Dr. Carl L. Larsen, of Saint Paul, who gave a very interesting talk on "Medical and Surgical Diseases of the Eye, Ear, Nose and Throat," especially dwelling on such cases as come under the observation of the general practitioner. He gave the latest ideas of treatment and emphasized some dangers that might be encountered in the treatment of these organs.

The regular meeting for the month of November, held on November 14, at the Stillwater Club rooms, was addressed by Dr. Frank J. Savage, of Saint Paul. Dr. Savage is the state chairman for the National Physicians' Committee for the Extension of Medical Service. He spoke at length on the subject and answered many questions pertaining to it. This is now a very important subject. A committee of four doctors met with the Stillwater School Board in the matter of acquiring an audiometer for use in Stillwater, Oak Park, and Bayport schools by the school nurse. This subject was thoroughly discussed at a county meeting, some members believing that no diagnostic instrument should be put in the hands of the laity. The matter, as far as the Society is concerned, is still unsettled. The Society went on record in favor of a full-time county health nurse.

E. SYDNEY BOLEYN, M.D.,
Secretary.

THE JOHN W. BELL LECTURE

The Fifth Annual John W. Bell Tuberculosis Lecture will be delivered by Dr. Frederick Taylor Lord, of Boston, on the evening of Monday, December 4, in the Auditorium of the Hennepin County Medical Society. The title of the lecture will be "The Clinical Aspects and Diagnosis of Pulmonary Lesions" and it will include a discussion of the history, physical and x-ray examinations and such special methods of examination as bronchoscopy, bronchography and thoracentesis. Such clinical groups as hemoptysis, primary pleurisy, pneumonia and pulmonary tuberculosis will be considered. The lecture will be illustrated with lantern slides.

Dr. Lord, a graduate of Harvard Medical School, has spent his entire professional life in Boston, specializing in diseases of the chest. He has been a teacher in his alma mater and on the staff of the Massachusetts General Hospital for over thirty years and is now emeritus clinical professor of medicine in the former and a member of the board of consultation in the hospital.

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Stated Meeting, Thursday, May 4, 1939

President, DR. GEORGE R. DUNN, in the Chair

Secretary, DR. HARVEY NELSON

REGIONAL ENTERITIS

Report of Case

LAWRENCE M. LARSON, M.D., Ph.D.
Minneapolis

All physicians doing abdominal surgery should be thoroughly familiar with the condition termed regional ileitis. This is especially true because not infrequently an obscure abdominal condition not diagnosed pre-operatively will be revealed at operation as ileitis. Many instances in the past of this disease have gone untreated or, at best, simple appendectomy done because of unfamiliarity with its therapy. The disease is characterized by subacute or chronic inflammatory changes in the small bowel which result in cicatrization, stenosis and fistula formation. Many of these cases are not diagnosed preoperatively. The reason for this difficulty is the rarity of the condition along with its confusing symptomatology, especially its differentiation from appendicitis, ulcerative colitis, intestinal tuberculosis and neoplastic disease. It is with this thought in mind that a description is herewith given of the main features of the disease together with a case report illustrating many of these points. Furthermore, the disease is rare enough so that its life history, especially as influenced by various methods of treatment, is worth recording.

Prior to 1932 many cases of cicatrizing enteritis producing tumefaction were present in the literature. However, in 1932, following the work of Crohn, Ginzburg and Oppenheimer, this group of cases was classified under the heading of a new disease, as distinguished from those with a specific etiology such as tuberculosis, lues, actinomycosis, amebiasis and so forth. Since this work, further studies have corroborated their findings. At first consideration, it would seem that the condition is becoming more common. This probably is not true, since perusal of the literature shows many nonmalignant granulomatous tumors of the bowel which could fall into the classification described. Studies of this disease by Ginzburg, Crohn, and Oppenheimer showed definite exclusion of a specific etiologic factor. While their studies did not establish a particular organism as the causative factor, yet they described the pathologic and clinical factors so clearly that no doubt was left as to the fact that the disease is a definite entity, as yet of unknown etiology. It seems strange that previous to their description the disease was unrecognized—in fact one wonders whether it really existed, since few reports accurately describe a condition coinciding with regional ileitis. Their original article was so complete that little has been added although approximately 600 cases have been

reported since 1932. The main contribution since their original work has been the demonstration of an identical disease process affecting any segment of the small bowel and occasionally the colon. Other than this, since the report of the first case there has been little added to our conception of this disease.

Etiology and Pathology.—Many names have been suggested for this disease but the term "regional ileitis" seems most expressive and applicable. Other names used are terminal ileitis, chronic ulcerative ileitis, and chronic cicatrizing ileitis. The disease is definitely one of young adults although it has been described in children and in elderly individuals. It occurs twice as often in males as in females. The disease, as stated, is of an unknown etiology although, because of the large number of giant cells in histologic section in some cases, tuberculosis has been suspected. These giant cells probably are produced by the presence of food particles gaining entrance to the tissue through ulcerations of the mucosa. No acid-fast bacilli have been demonstrated. Bacillary dysentery has been described as a forerunner of the disease but agglutination tests do not bear this out. Felsen's work in substantiation of this theory has not been proved in subsequent work. Various diplococci, streptococci, and bacilli have been found in the lesions but these are undoubtedly incidental findings.

Recently Pumphrey made an extensive study on the etiology of this disease, including bacteriologic and pathologic examination of the bowel lesions and of the regional nodes, but was unable to identify any causative organism. Tuberculous etiology was excluded by negative reactions to guinea pig inoculations and evidence of dysentery organisms was not found by the usual agglutination reactions of the patient's serum. It is still entirely possible, however, that an atypical tuberculosis could produce the picture of this disease. In an interesting piece of work Reichert and Mathes produced chronic lymphedema of the intestinal walls by the injection into the regional lymphatics of an irritating material. This produced a picture similar to that seen clinically in regional ileitis, characterized by low grade infection associated with edema of the intestinal wall. It seems entirely possible that an adenitis in the mesentery, especially near the ileocecal region, could produce this picture. Anatomical abnormalities of the ileum, and anomalies of position and fixation resulting in stasis, kinking, twisting and intussusception, and accidental piercing of the mucosa by foreign bodies (such as fish bones) followed by subsequent bacterial invasion have all been mentioned as of etiologic significance. At any rate the etiologic factor still remains a conjecture.

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Grossly the bowel afflicted by this disease is characterized by a segment 10 to 40 cm. in length which is thickened, hypertrophic, soggy, and edematous and covered by a reddened serosa. The lumen of the bowel is decreased in size due to this thickening. The corresponding mesentery is likewise affected and is of a similar thick, edematous appearance. Small tubercle-like areas frequently occur on the serosa but these are collections of lymphocytes and are not tuberculous. The mucosal side of the bowel is likewise hypertrophied, smooth, and of cobblestone appearance. There is no elasticity either to the bowel or its mesentery. As a result of this hyperplasia, the wall of the bowel becomes so thickened that it takes on a rope-like rigidity. The location of the diseased area is more frequently in the terminal ileum although it may occur anywhere in the small gut. It has been described in all portions of the jejunum or ileum. There is some evidence to indicate that the older lesions are located near the ileocecal valve while the more recent ones are situated proximally as high as the upper jejunum. The appendix has not been found to be involved in the inflammatory process although it may exhibit varying degrees of subacute inflammation. The latter is due to secondary involvement rather than a primary one.

In early cases, ulcerations of the mucosa have been described as consisting of oval areas about one centimeter in diameter lying on the mesenteric border of the small bowel. This finding undoubtedly represents a very early stage of the disease, one which is rarely seen because the diagnosis of this disease at this time is practically never made. At a late stage there may be almost a complete loss of epithelium, and in healing areas the surface is polypoid and granular.

Histologically, varying degrees of acute, subacute, and chronic inflammations are present. There are no specific characteristics. In the earlier lesions the reaction is more likely to involve mainly the mucosa and submucosa while later the serosa shows a similar disease process, indicating the origin of the disease is in the mucosa, with progression towards the serosa. There may be edema, lymphoid cells in focal collections, giant cells, etc. Confusion with tuberculosis has resulted from the finding of giant cells, but these originate from a foreign body reaction present when food particles lodge in the mucosa. True tubercles with caseation and epithelial reaction are absent. Late, fibrous tissue piles up and replaces the submucosa and muscularis. The mesentery is likewise infiltrated by an inflammatory exudate and bleeds readily.

Since the inflammatory process is an extensive one, adhesions of neighboring structures take place with consequent slow perforation and fistula formation. This is a common feature of the disease and usually takes place between a loop of small bowel and the colon. Thus spontaneous cure or alleviation may occasionally occur. Perforation into the free peritoneal cavity is practically unknown but when it does occur it is such a slow process that abscess formation takes place. When such an abscess is drained surgically, the

resultant fistula persists until it is surgically repaired. Incomplete removal of the diseased area likewise usually results in the formation of an external fistula.

The end-result of any chronic inflammation is scar formation, and this is likewise true in regional ileitis. Stenosis eventually takes place by replacement of the submucosa and muscularis with fibrous connective tissue, producing the typical obstructive phenomena which characterize this disease. At times the ileocecal area may be so thickened and narrowed as to barely admit a probe. Above the stenotic area, the bowel becomes hypertrophied and dilated due to the compensatory mechanism of attempts to overcome the obstruction. After obstruction occurs, the conditions are the same as exist for any other obstruction.

Clinical Features.—In all series of cases reported, it has been emphasized that young adults predominate 2:1 with the ratio of males to females being reported as about 5:1. The symptoms run a characteristic course and correspond to what one would expect from the pathologic changes. Since the disease is one of obstruction superimposed upon an enteritis, the symptoms are dependent upon the stage of the pathologic process. The most frequent symptoms are abdominal pain, cramps, diarrhea, nausea, vomiting, distention, and loss of weight and strength.

The disease may usually be divided into four stages. The first is that of an acute inflammatory condition with leukocytosis, low grade fever, pain over the lower abdomen, especially the right side. It is this stage in which appendectomy is frequently done. Later, excessive intestinal activity is present such as nausea, vomiting, cramps, diarrhea and these symptoms may come intermittently. It is common to palpate a mass at this stage. If treatment is not successful, the stenosing effect soon becomes the prominent feature. Distention, severe cramps, visible peristalsis, anemia, malnutrition soon follow. The final stage occurs when either acute obstruction or perforation and abscess formation takes place. Debility, malnutrition and anemia by this time may be extreme, due to reduced food and fluid intake and to toxemia and loss of fluids from diarrhea. Remission of symptoms is common.

The diagnosis is confirmed by x-ray and the barium is used first by enema before being administered by mouth, since it is possible that a partial obstruction may be converted into a complete one by the packing effect of the barium. However, it is best to use both methods if at all possible. The main diagnostic signs have been described by Kantor: (1) a filling defect just proximal to the cecum; (2) abnormality in contour of the last filled loop of ileum; (3) dilation of loops of ileum just proximal to the lesion; (4) a "string" sign representing the actual lesion. Other stenosing lesions of the bowel such as tuberculosis may produce similar signs so that the x-ray alone is not pathognomonic. The most common disease requiring differential diagnosis is chronic ulcerative colitis and this of course is of importance, since it is a disease treated medically, while regional ileitis is a surgical condition. The

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other lesions to be considered are tuberculosis, syphilis, actinomycosis, malignancy, appendiceal abscess, foreign body, etc. Many times exploratory operation alone will settle the diagnosis.

Treatment.—The ideal form of treatment by no means has been found and it is possible that in the future some form of medical measures may cure this disease. At present, however, it is certain that surgical procedures are the only ones which so far have produced cures. In the preoperative care there are several factors of great importance. First of all it is imperative to build these patients up prior to any surgical procedure, by intravenous infusions of fluid glucose, blood transfusions, and so forth. Secondly, the importance of decompression of the bowel both preoperatively and postoperatively cannot be overemphasized. This of course is best done by the nasal catheter suction siphonage of Wangensteen. Continual suction postoperatively until peristaltic activity has returned is recommended as a preventative of distention. Experience has shown that gaseous distention is much more easily prevented than relieved after it has occurred.

There is no question that primary resection with anastomosis offers the best chance for cure, in the light of our present knowledge of this disease. Ileocolostomy alone in some cases of course is necessary where the patient's condition prohibits more extensive operation. However, in these cases it is questionable whether the portion of bowel put at rest will heal. There is much evidence to show that extension of the disease will still take place; in fact the large majority of cases observed so far have actually done so. If obstruction has occurred, and only a short circuiting operation done, then a blind stump is left, which produces reflex and toxic disturbances which may be very annoying to say the least. Therefore, if resection of the diseased bowel cannot be done at the first stage, it certainly should be done at a later time.

Case Report

This patient when first seen was twenty-six years of age. She had been married two years and had been in exceptionally good health except for the disease described. Her past history and family history was irrelevant. About four years prior to her admission to the hospital she first noticed increasing pain in the right lower quadrant which at first was of a mild colicky nature, lasting only a few minutes, and came after eating. Soon, however, this pain increased in its severity, the spells became more frequent, and as time went on they increased in their duration. She noticed that certain foods such as vegetables, coarse breads, and heavy foods aggravated her symptoms, so therefore she learned to avoid them. After about six months of these symptoms she lost from ten to fifteen pounds in weight. About this time there appeared intervals of nausea which were prone to come on at the time when the abdominal pain occurred. It was not long after this that she occasionally vomited a meal soon after eating. Appendectomy was done in December, 1932, with about five to six weeks of relief, mainly because she ate little or no solid food at this time. Soon, however, when she began to eat normal amounts of food her former symptoms reappeared but she controlled these fairly well by extreme care in her

diet. Several weeks after the appendectomy she began to have diarrhea consisting of several liquid stools daily, accompanied with a great deal of colicky abdominal pain. Her loss in weight became progressive and in several months she lost another twenty pounds. She was also weakened considerably and was forced to remain in bed most of the time.

This patient was first seen in November, 1933. She weighed 68 pounds, temperature 100.2 and pulse 94. On examination at this time she appeared quite ill. Her face was rather drawn, her color was pale, and she was in considerable pain. A general examination was negative except for the abdomen. There was a moderate amount of gaseous distention present. A recent right McBurney scar had healed completely. Peristaltic waves were visible throughout the right abdomen. Palpation of the lower abdomen elicited considerable pain especially on the right side and there was slight spasm and rigidity present. There was a suggestion of a sausage-like mass in the lower abdomen on the right side. Pelvic examination gave negative results. Laboratory examination: hemoglobin was 64 per cent; R.B.C. 2,640,000; W.B.C. 18,300. The urine was normal. A tentative diagnosis of obstruction of the lower portion of the small bowel was made and the patient given several days of preparation prior to surgical intervention. Pre-operative care consisted in continuous nasal suction, intravenous fluids, frequent doses of morphine and absolute withdrawal of food and fluid by mouth. In three days the condition of the patient improved markedly. The distention practically disappeared and her pain left her so that no further opiates were necessary. At this time it was considered advisable to study the intestinal tract fluoroscopically by means of a thin suspension of barium given orally. The barium passed readily down the lower portion of the ileum where the bowel was seen to become narrow, producing the typical "string sign." A small portion of barium passed through this obstructed area and some of it appeared to pass directly into the transverse colon. Most of the barium, however, proceeded the usual way through the ileocecal valve. A similar type of barium suspension was used as an enema and by fluoroscopic examination a fistula could be made out between the transverse colon and small bowel. A diagnosis of an obstructive lesion of the small bowel was made. On November 15, 1933, a mid-line incision was made and on exploration of the abdomen there was present a thick, hard, edematous, tumor-like mass involving a segment of the ileum 18 cms. in length located 20 cms. from the ileocecal valve. The corresponding mesentery was thick and edematous. The serosa was dull and rough. The proximal portion of this diseased segment was attached to the middle of the transverse colon and a portion of omentum had attached itself firmly about this area. The regional glands were large and boggy. The remainder of the bowel was entirely normal. Since the patient's condition was rather precarious it was decided that a short-circuiting operation alone was indicated. A portion of ileum 12 cm. proximal to the diseased segment was then anastomosed aseptically to the distal portion of the transverse colon by means of a three-bladed (Rankin) clamp. Fat tags from the omentum were used to reinforce the suture line. Next the attachment of the diseased segment of ileum was removed from the transverse colon and it was found that this represented an internal fistula between the two portions of the bowel involved. After separation of these segments the ileal portion of the fistula was inverted with transverse suture of the layers of the bowel and the suture line reinforced with omentum. A similar process was used in closing the colonic perforation. As a final step in the operation, a Witzel type of enterostomy was done about 15 cms.

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above the ileocolostomy. The abdomen was then closed in the usual manner bringing the enterostomy tube through the lower angle of the wound. A transfusion of 500 c.c. of citrated blood was given immediately after the operation.

Postoperatively, nasal suction was used continuously for five days. Foods and fluids were withheld by mouth, intravenous fluids administered, and large doses of morphine given regularly. The enterostomy tube started to drain both gaseous and liquid material on the second day and this continued until the tube came away spontaneously about the seventh day. No fistula remained at the site of this tube and the wound healed promptly. Convalescence was entirely normal. She left the hospital three weeks postoperatively. Her diet consisted of foods with a low residue, and in several months time she regained her usual strength. In three months her weight returned to a normal of 112 pounds and in six months she weighed twenty pounds more than her usual weight. During this time she was allowed an increasing amount of food with bulk, although she was always advised to eat in small amounts and frequently. Her only symptoms during this time consisted of gurgling and occasional colicky pains in her lower abdomen. These disappeared entirely within a year after the operation. Since that time she has undergone two pregnancies, one in 1936 and one in 1938, both of which have been normal. At the present time, five and one-half years after the operation, she is as healthy and as strong as any individual of her age. She has been advised to have a resection of this diseased segment of bowel but she feels so well that so far she has refused. However, she is still careful as to overeating, to overexposure of any sort, or to emotional upsets. There is yet a possibility of recurrence although several x-ray checkups have always showed complete healing of the diseased process. The lumen of the involved area has reopened to practically a normal extent, there is no ulceration of the bowel and no evidence of active inflammation.

In addition to this case, nine additional ones were found in the records of the Department of Pathology at the University of Minnesota. It is interesting to note that only three of these were recorded under their correct name, and the remainder were found only by searching through such headings as ileocolitis, colitis, enterocolitis, enteritis, stenosis of the ileum, atresia of the bowel, granuloma of the bowel, etc. These nine cases offer nothing new or different than what has been described. They illustrate again the fact that since the original description of this disease, little has been added to our knowledge of this disorder.

Discussion

DR. RUSSELL MORSE (by invitation): Members of the Minneapolis Surgical Society, it is a pleasure to be before you again, and to discuss this subject. From our material we can illustrate several things which Dr. Larson has had to say in regard to enteritis. First, the patient that he has discussed. We had the opportunity of x-raying this individual over a period of twenty months, all of the examinations being made post-operative. During that time the picture was relatively the same. We found, as shown in this film, an area of stenosis in the lower ileum, taking in probably about eight or nine inches, the maximum point of stenosis being at the superior extremity and then the amount of stenosis varying at the different levels toward the ileocecal valve. During that period of observation the only change we noticed was that there was a disappearance of rigidity of this segment and a return of pliability. In other words, the first examination, which was made within two months following the operation, still showed active disease and the last

examination, which was made about twenty months after operation, showed no evidence of activity.

In the last film made, we had the picture of the end stage of an ileitis in that we had stenosis due to scar tissue formation, without any evidence of activity and probably without any ulceration of the mucous membrane.

In the cases we have seen we were able to demonstrate the various stages of this inflammatory process. It is very important to recognize that in this disease we can have many degrees of severity in the extensiveness of the process, and many degrees of severity in regard to the actual inflammatory process.

The first case which we saw was a typical regional ileitis in that there was an area of stenosis with typical string sign due to a marked stenosis of the entire lower ileum. One streak of barium represented the appendix, while a fainter streak extending through a long segment of the lower ileum was the lumen through the area of stenosis of a granuloma. This individual was observed again thirty days after the first examination and during this period of time the lumen in that segment returned to a fair degree of patency except for the last inch before the ileocecal valve. At this stage a primary resection was done with anastomosis of ileum to transverse colon, and we were able to submit the specimen to the University as a specimen of ileitis.

In the second case we saw, the first films were made about three months after appendectomy was done. At the time of appendectomy the surgeons noticed a boggy edema of the lower ileum. Three months later there was an abscess. Perforation had occurred and there was an abscess in the region of the terminal ileum. This patient was followed for six months and then resection was done. At that time the specimen showed a chronic granuloma. In other words, instead of the edema we had more of a connective tissue proliferation and almost entirely a lymphocytic infiltration. There was even at that time, nine months after onset of the lesion, considerable ulceration of the mucous membrane.

Then we have the lesser degrees of involvement and these vary all the way from minor inflammatory changes to a relatively severe inflammatory process. In one individual the outstanding feature was a lack of pliability of the lower segment of the ileum. The striking thing was that along the mesenteric border we had a complete fixation without muscular contraction, with retention of muscular contraction on the opposite side of the bowel, in fact an increased depth of peristalsis due to the fixation of the mesenteric side—due to induration. That goes with the finding that Dr. Larson has mentioned, that ulceration first occurs along the mesenteric attachment side of the bowel. This patient was also followed along for a good many months and at six months we have a record which shows a return of pliability in this distal segment of the ileum. At this time also the patient was entirely free from symptoms.

Another patient showed a very minor change. There was merely a relative narrowing of the terminal ileum with a moderate dilatation above that point showing that the intestine was having difficulty forcing the barium through the lower segment. This individual had, for some reason or another, an unusual amount of pain. We recognized here that we were dealing with a minor condition as far as the inflammatory process went, and yet, because of the severity of pain, after a period of observation it was decided that operation was necessary. At operation the only thing that could be found was a crackling on palpation of the soft tissues of the terminal ileum due to edema. A primary resection was done. We submitted the specimen to the University and they told us that it looked entirely normal on gross inspection. There was no ulceration

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of the mucous membrane and yet on microscopic study they found considerable edema and again the characteristic thing—*infiltration of the subserosal tissue*. Polymorphonuclear leukocytes were more plentiful in the microscopic section than they are in the more granulomatous stages of this disease. This represents a very minimal type of enteritis and yet, for some peculiar reason, in this individual pain was so severe that it was decided that operation was necessary.

In the following case we have another modification. There was no stenosis of the distal segment and yet there was a marked irregularity of the mucous membrane at the terminal ileum and also at the base of the cecum. This lesion was observed first at operation during appendectomy and we had a chance to study it because the condition was recognized. This type of lesion cannot be differentiated in any way from the x-ray standpoint from a tuberculous enteritis or probably from other types of enteritis. I think that in all of these cases one of the first things one must do in a differential diagnosis is to get an x-ray of the chest. If tuberculosis is absent in the chest, then it is reasonable to assume that the lesion in the intestinal tract is not tuberculous. This, by the way, was the youngest individual we had, a boy twelve years old. Most of the others were in the twenties.

It is important to recognize the fact that these conditions are not limited in the small intestine to one segment, that they can occur at any level and in any individual there may be more than one area involved.

The next case dates back to 1927. The patient was x-rayed by Dr. Belden at New York Hospital and the multiple areas of stenosis in the lower ileum were diagnosed as hyperplastic tuberculosis, as we all were doing at that time. The pathologist reported a non-tuberculous lesion. We had a chance to see it because Belden was so flabbergasted by the pathologist's report that he came to us for moral support and we very foolishly, as we know now, told him that we thought he was absolutely right, and the pathologist was wrong. Looking back on it now we know that it was a non-tuberculous enteritis.

In the last two years we have seen three cases with multiple areas of involvement in the small intestine. Dr. Cabot can tell you about one.

In this next case, one of the nurses at St. Barnabas Hospital, there were visible on x-ray several areas of partial stenosis in the upper ileum and in the terminal ileum areas of more complete granulomatous stenosis. This patient also finally came to operation. We observed her over a year and her obstruction became so marked that it was necessary to do something for relief. Unfortunately, she died following the operation. The specimen is also at the University.

Granulomatous lesions occur also independently in the colon. One film dates back a good many years. It showed a constricting lesion in the hepatic flexure region of the colon. At that time we called all of these hyperplastic tuberculosis and because of the giant cells, even though they are not characteristic of tuberculous giant cells, the pathologist concurred in the report that it was a hyperplastic tuberculosis.

Four years ago we had a chance to observe a patient with Dr. Ford in which we found one of these granulomatous lesions in the ascending colon. The individual has recovered without operation and is entirely well at the present time.

In closing I would like to call attention to the type of case that may confuse an observer although the history of frothy soapy stools should put one on his guard, and that is the case of non-tropical sprue whether true non-tropical sprue or due to carcinoma of the pancreas. In this case, of course, we know we

get a segmental distribution of the barium throughout the intestine due to its upset physiology. In addition to that we get an edematous condition of the mucous membrane and submucosa, similar to what we have in gastritis, and eventually we get a loss of mucous membrane markings and undoubtedly ulceration. This type of lesion may simulate in its appearance the appearance of regional enteritis.

DR. J. F. CORBETT: I was greatly interested in this paper of Dr. Larson's, particularly with the x-rays that we saw. I am going to ask your indulgence while I report two patients that I took care of.

The first one showed a typical appearing granulomatous type. In this the large bowel was not particularly involved except exactly at the junction with the ileum. There there was a marked ulceration. This patient presented a sort of a colicky action of the bowel, such as you commonly see with carcinoma and therefore an x-ray was taken. In place of finding a carcinoma, the string sign was present although of not very great length, a very short narrowing of the bowel. At operation we found the terminal ileum was thin and atrophic and beyond this thinned out area there were multiple lesions of the beginning of the granulomatous spots.

I resected twelve inches of the small bowel and half of the cecum in this case. That was done one and one-half years ago and this patient has had no recurrence of any symptoms since then. Our attention probably was centered on this subject by the excellent paper that Jackson wrote and read at the Western Surgical Society meeting and before that we have probably all seen cases of terminal ileitis but had not applied that term.

The second case was of an entirely different type. In this, most of the disease was in the cecum. It was enormously thickened both from edema and infiltration of the submucosa so that I thought I was dealing with a carcinoma and did a radical resection. In this case there appeared to be what I described as a phlegmon of the large bowel and this showed signs of breaking down at the time that I operated. I did a very radical operation and the man made a good recovery.

Many times these cases are missed at operation. Many of the cases of terminal ileitis have been discovered after appendectomy has been done and often times they even go on to autopsy before a diagnosis is made. That is why I think this paper is a matter of importance to us all.

DR. VERNE S. CABOT: In the past two years we have seen five of these cases; three were women and two men all within the age range of twenty-two to thirty-five years.

DR. MORSE has shown the films of a nurse who had multiple segmental involvements, complicated by internal fistulae and secondary abscesses. The extent and character of her lesions precluded resection although drainage of abscesses was done, with but slight benefit, for she finally succumbed several months later in a state of exhaustion.

The first patient we saw ran contrary to the usual type in that this man had a gangrenous appendix in addition to an advanced regional ileitis of the terminal 30 centimeters. He is in good health at present despite the fact that periodic gastro-intestinal examinations show presence of the original area of involvement though with lessening narrowing of lumen and no symptoms referable to it.

The patients with advanced ileitis and especially those with multiple areas of involvements present a very serious problem.

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DR. MARTIN NORDLAND: Dr. Larson's discussion of regional ileitis has been very comprehensive. There is very little to add since he has reviewed the subject thoroughly.

Dr. Morse's remarks with reference to the x-ray findings in this disorder have added much to emphasize the value of this kind of an examination without which a diagnosis would be impossible.

I would like to make a few remarks with reference to the pathology in this lesion. In the first place no single microscopic study is sufficient to make a diagnosis. Pathologically it is classified as a granuloma and it is characterized by a chronic exudative inflammation with a marked invasion of p.m.n. leukocytes, similar to a chronic lymphangitis. There is a conspicuous fibrous infiltration of all the coats as well as a marked thickening of the mesentery together with an acute adenitis. Miliary abscesses are common in the walls, which accounts for rupture of the viscera and the formation of fistulae. Grossly, there is a marked involvement of the peritoneum which accounts for the wide adhesions between the affected segment of the bowel and surrounding structures.

As Dr. Larson has pointed out, the decision of a primary section depends upon the condition of the patient. No immediate resection should be done in the debilitated patient.

FRACTURES OF THE METACARPALS AND PHALANGES*

Inaugural Thesis

KENNETH FRITZELL, M.D.
Minneapolis

Because fractures of the metacarpals and phalanges are not always given the consideration they deserve, and in order to compile concrete evidence of the end results of treatment of these injuries, I have studied a series of fractures seen at the Minneapolis General Hospital and in private practice. The group studied for estimation of end results consists of 151 patients, forty-nine of whom returned for examination. These latter represent fifty-one injuries, forty-seven of which were simple fractures, two were compound fractures, and there were two dislocations. Two open operations were done; one an osteotomy for dorsal angulation of the metacarpal shaft, the other an open reduction of a metacarpo-phalangeal dislocation.

Most of the fractures occurred in males during the active years of life and there was an overwhelming predominance of injuries to the right hand.

The metacarpals were the site of twenty-five of the fractures, ten of these being in the first metacarpal and of these ten all involved the base. The fifth metacarpal was fractured eight times and the second and fourth three times each. Of the fractures of the metacarpals other than the first, eight occurred in the shaft and seven in the head.

The phalanges presented twenty-four fractures, seven of which were in the thumb and of these, five involved the proximal phalanx.

In the fingers, eleven fractures were in the proximal phalanges and three in the middle phalanges and three in the distal, a total of seventeen.

Of the two dislocations, one was at the metacarpophalangeal joint and one at the proximal interphalangeal joint.

Injuries to the epiphyses are not common and none appear in this series.

There were only two compound fractures studied. The presence of open wounds in fractures of the bones of the hand is a serious problem and the presence of such soft part damage increases the morbidity. It is not the purpose of this study to concern itself with treatment of soft tissue injury.

The diagnosis of fractures of the bones of the hand is largely the result of evaluating the history with attention being paid to the actual mechanism involved. Symptoms play a prominent part and a story of proper mechanism followed by adequate symptoms should indicate the need for proper x-ray study. In the absence of obvious deformity, physical examination has no characteristic indicative of fracture. Swelling and discoloration are common in all injuries of any degree involving the hand.

Healing of fractures of the phalanges is peculiar in that clinical disability is terminated long before roentgen study indicates union. Rider, and Smith and Rider, who studied the x-rays of one hundred consecutive cases of phalangeal fracture, state that the average time for healing was five months, the line of fracture being most distinct thirty days after the injury. Clinical healing occurs in about one-fourth of the time needed for healing from a roentgen standpoint.

In a general way, early mobilization is necessary, the estimate of healing being based on clinical experience. There are no non-unions in the cases in this series but at present we have under our care a patient with at least delayed union in a badly compounded fracture of the proximal phalanx.

Fractures of the terminal phalanges are frequently compounded and treatment is directed chiefly to the soft parts. It is worth considering that the nail is a fairly efficient splint and where practicable should be retained. Short splints of almost any type will suffice for treatment of fractures of the tuft or the shaft, but fractures of the base at the tendon insertions deserve extra care. Hyperextension or hyperflexion, depending on whether the chip is from the dorsal or volar surface of the base, should be maintained for from four to six weeks. It must be remembered that position should be strictly maintained during the change of dressing.

Treatment of middle phalanx fractures is frequently misdirected. The rule of placing the distal fragment in line with the proximal portion should of course be followed. The attachment of the sublimis tendon is at about the mid-portion of the shaft and consequently the direction of angulation will vary, depending upon whether the line of fracture is distal or proximal to the insertion. Fractures distal to the insertion are best treated in a curved splint while those proximal to the tendon attachment are best held in a straight dorsal splint.

The typical deformity in fractures of the proximal

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phalanx of the fingers is volar due to the pull of the interossei downward on the proximal fragment and the pull of the lumbricales on the dorsal aponeurosis, causing the distal end of the distal fragment to be pulled upward. With this in mind, it is obvious that splinting should be accomplished with flexion of the finger; in other words, placing distal fragment in line with the proximal. Jahss has described a method for fixation of fractures of the phalanges which seems to have some advantages. When the proximal interphalangeal joint is flexed to 60 degrees, which is the normal limit, the posterior articular capsule becomes tense and any further flexion will move the head of the phalanx toward the palm and so reduce the deformity. The finger is then held in place with adhesive strips. In fractures of the middle phalanges with anterior angulation, he straps the distal to the proximal phalanx with the interphalangeal joints in full flexion.

Fractures of the second to fifth metacarpals may be divided into those of the head or distal end, those of the shaft, and fractures of the bases. Fractures of the heads are most common and the deformity is well known. Transverse fractures of the shaft, too, have the displacement when present, of such nature that the knuckle is depressed and angulation is dorsalward. This is due both to the injuring force and the action of the interossei. Reduction should be done with particular care to disimpact when necessary, and may sometimes be accomplished with the use of a clamp as suggested by Murray. The hand is best put up in a posterior splint with padding over the angular deformity and pressure exerted under the head in order to maintain the correction. Bosworth has had good results in a fracture of the fifth metacarpal by fixing the distal fragment to the fourth metacarpal with two steel pins. Fractures of the metacarpal bases, unless the deformity is unusually marked, need only a posterior splint which includes wrist, hand and forearm.

Certain fractures of the shafts of the phalanges and metacarpals need skeletal traction for reduction or maintenance. It should be used whenever necessary, and is a great convenience in dressing soft-part wounds, enabling one to handle the tissues without disturbing bony alignment. Traction should always be applied with the same rules of direction in mind as when using other splints. I believe that it is undeniable that skeletal traction as opposed to adhesive or finger trap or finger nail methods is completely accepted.

Fractures of the proximal phalanx of the thumb have, in the textbook type of case, a deformity maintained by the action of the transverse and oblique adductors and therefore should be immobilized in flexion and adduction.

The first metacarpal is a site for a number of specific types of fracture. Those of the shaft and head need no further discussion, but those of the base are deserving of special consideration. Winterstein has investigated the architecture of the first metacarpal and finds that it varies with age. Essentially, however, the

internal structure is fairly constant and it is obvious from the slide shown why true Bennett's fracture and that known as Rolando's fracture do occur.

A true Bennett's fracture, as described by him in 1881, involves the palmar portion of the base only and the fracture line angles into the joint. The resultant deformity is one of dorsal dislocation of the distal fragment.

A more severe fracture may involve the dorsal portion of the base of the bone as well, and the fracture line be more or less "Y" shaped. This is termed a Rolando fracture.

Bennett's fractures are best treated by abduction of the thumb with the thumb in the plane of the palm. Murray feels that fixation should be in adduction and flexion parallel to the plane of the extended fingers. He feels that any limitation of motion in the metacarpophalangeal joint is then in abduction and extension, which are less important. Open reduction with nailing of the fragments has been tried by Lambotte in 1908 but the success of this procedure is questionable.

In the Rolando type of fracture, abduction is all that is usually necessary. The prognosis here is better than in the true Bennett form.

These cases were collected from the Out-Patient Department at the Minneapolis General Hospital, but do not indicate the true number treated, as many patients after receiving initial treatment in the emergency ward do not return for further care for what they may regard as a trivial injury. For this reason also, it is apparent that only the relatively severe fractures are here included. Injuries in which damage to soft parts is a major element are seen in the general surgical clinic, and for this reason many of this type were not found.

Treatment in these cases was started by a number of individuals. No constant method has been applied and almost all methods of fixation have been used. All cases requiring manipulation under general anesthesia or the use of skeletal traction have been treated as resident patients.

For all these reasons it is difficult, if not impossible, to reach definite conclusions or estimates.

Comparative figures for morbidity are not common. Ziegler found 24.9 per cent invalidism in 403 cases of fractures of the fingers. The figures obtained by Wilson at the Massachusetts General Hospital are illustrated by the slides. He has developed a method of recording end-results which will also be illustrated. He estimates anatomical, functional and economic loss and fixes the classes of rating arbitrarily. Our figures were fixed by the same limits but there is obvious discrepancy in the estimates made by different observers. It has also been impossible to estimate economic disability in our patients.

For various reasons, then, it is not satisfactory to compare statistics, but the comparison may serve to stimulate the recording of end-results in some standard manner.

Our findings are illustrated in the charts shown. Of the ten fractures of the base of the first metacarpal,

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only one had disability—it amounted to 33 per cent. These good functional results obtained in spite of the presence of only fair anatomical results in six cases.

The cases falling in the classes in which functional disability ranged from 37.5 to 87.5 per cent were distributed among all the bones, no one site or method being responsible for poor results. The impression gained is that the nature of the bone injury itself has little to do with the terminal disability but that a mechanism of injury which includes damage to soft parts, or a treatment which includes too long immobilization, are factors which predict a poor functional result.

Bibliography

1. Boworth, David M.: Internal splinting of fractures of the fifth metacarpal. *Jour. Bone and Joint Surg.*, 18:826-827, (July) 1937.
2. Brailsford, James F.: *The Radiology of Bones and Joints*. London: J. & A. Churchill, 1934.
3. Jahss, S. A.: Fractures of the proximal phalanx of the thumb. *Amer. Jour. Surg.*, 39:1, 130-132, (Jan.) 1938.
4. Jahss, S. A.: Fractures of the proximal phalanges. *Jour. Bone and Joint Surg.*, 18:726-731, (July) 1936.
5. McNealy, R. W., and Lichtenstein, Manuel S.: Fractures of the metacarpals and phalanges. *Surg., Gynec. and Obst.*, 55:758-761, (Dec.) 1932.
6. McNealy, R. W., and Lichtenstein, Manuel S.: Bennett's fractures and other fractures of the first metacarpals. *Surg., Gynec. and Obst.*, 56:197-201, (Feb.) 1933.
7. McNealy, Raymond W., and Lichtenstein, Manuel E.: Fractures of the metacarpals and phalanges. *West. Jour. Surg., Gynec. and Obst.*, 43:156-161, (March) 1935.
8. Murray, Clay Ray: Fractures of the bones of the hand. *N. Y. State Jour. Med.*, 36:22, 1749-1761, (Nov. 15) 1936.
9. Rider, Dean L.: Fractures of the metacarpals, metatarsals, and phalanges. *American Jour. Surg.*, 37:549-559, (Dec.) 1937.
10. Smith, Frankes L., and Rider, Dean L.: A study of the healing of one hundred consecutive phalangeal fractures. *Jour. Bone and Joint Surg.*, 17:91-109, (Jan.) 1935.
11. Vernon, S.: Fracture of the proximal phalanx of the thumb. *Amer. Jour. Surg.*, 39:1, 130-132, (Jan.) 1938.
12. Wilson, P. D.: *Experience in the Management of Fractures and Dislocations*. Philadelphia: J. B. Lippincott, 1938.

FRACTURES OF THE OS CALCIS IN CHILDREN

Report of Two Cases in Children Less than Six Years of Age

U. SCHUYLER ANDERSON, M.D. (by invitation)
Minneapolis

The incidence of fractures of the os calcis in children less than ten years of age is rare. Only one case was reported in the literature of the past twenty years; that of Cotton¹ cited in his book "Dislocations and Joint Fractures." Furthermore, a survey of the literature leads one to believe that the fracture is extremely infrequent in children more than ten years of age.

Bode,² in reviewing two hundred and thirty cases of fractures of the os calcis, found that no patient was less than fifteen years of age. The youngest of sixty-four patients with fractures of the os calcis treated by Yoerg³ in the past four years was sixteen years of age. There were only three children in a group of seventy-two patients with fractures of the os calcis studied by Cahill.⁴ He stated that the rarity of this fracture in children is probably due to the elasticity of the child's foot, which is formed chiefly by cartilage.

However, an examination of the ages of patients with fractures of the os calcis admitted to the Minneapolis General Hospital* indicated that the fracture is not uncommon in older children from ten to fifteen years of age. From 1931 to 1938 seventy-two patients with fractures of the os calcis were admitted to the hospital, eight (11 per cent) of whom were children ranging in age from eleven to fifteen years (Table I).

* From the Fracture Service, Minneapolis General Hospital, Minneapolis, A. A. Zierold, Chief.

TABLE I. EIGHT CASES OF FRACTURES OF THE OS CALCIS IN CHILDREN FROM THE MINNEAPOLIS GENERAL HOSPITAL

Case	Sex Age	History	Physical Findings	First Roentgenogram	Treatment	Last Roentgenogram	Final Results
No. 1 R. W.	Male 12 yrs.	Tractor wheel passed over left foot.	Left foot swollen and discolored	Fissure fracture left os calcis	Moulded plaster splint	Union	Normal function, no disability
No. 2 R. B.	Male 15 yrs.	Fell 15 ft.	Swelling, discoloration of both feet	Crush fractures of both os calcis	No manipulation. Circular plaster casts	None	Unable to learn
No. 3 J. Z.	Male 13 yrs.	Fall from roof of home	Swelling, tenderness of left heel	Fissure fracture of left os calcis	Circular cast. Walking iron cast	None	Unable to learn
No. 4 D. P.	Male 13 yrs.	Fall from second floor window	Swelling, discoloration of both feet	Crush fracture of left os calcis	Boehler's method	Union in mal-position	Good functional results. No disability
No. 5 E. S.	Male 13 yrs.	While diving struck left heel.	Swelling, discoloration of left heel	Crush fracture of left os calcis	No manipulation. Walking iron cast	Union in malposition	Good functional results. No disability
No. 6 R. P.	Male 11 yrs.	Fall from sign board	Tenderness of left heel	Crush fracture of left os calcis	No treatment	None	Unable to learn
No. 7 E. M.	Male 14 yrs.	Fall from moving truck	Swelling, discoloration of left foot	Fissure fracture of left os calcis	Circular cast	Union	Normal function. No disability
No. 8 L. M.	Male 14 yrs.	Fall from box car	Slight swelling of right heel	Crush fracture of right os calcis	Yoerg's method	Union in good position	Excellent functional results. No disability

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The roentgenologic diagnosis of fractures of the os calcis in children depends upon a knowledge of the developmental anatomy of the child's foot. The three bones which are present in the tarsus at birth are the os calcis, talus, and cuboid bones. The nucleus of the

fractures of the tuberosity, and fractures of the body. Avulsion fractures of the tuberosity in children are extremely rare.

Fractures of the body of the os calcis may be separated into two general classes: crush fractures and



Fig. 1. Case 1. Interpretative drawing of superior-inferior roentgenogram of os calcis of child, aged five years. Arrow on medial side indicates fracture with lateral displacement of inferior fragment.

body of the os calcis calcifies, according to anatomists,⁴ during the sixth month of fetal life. The epiphysis (apophysis) calcifies between the seventh and tenth years, and unites with the body of the os calcis between the thirteenth and twentieth years.

Köhler⁵ stated that occasionally the body of the os calcis calcifies from two centers, the first of which centers is laterally situated, calcifying in the fifth fetal month, and later becoming the trochlear process of the os calcis. The second center calcifies in the seventh fetal month and usually fuses with the first center before birth. This fusion, however, does not always take place, and a separate epiphysis of the trochlear process forms and persists until puberty. The epiphyseal line of this process may be mistaken for a fracture.

The epiphysis (apophysis) of the os calcis infrequently has two or three centers of calcification, and when this condition obtains it may be confused with a fracture of the epiphysis. Roentgenologic examination of both heels avoids such mistakes, since the centers of calcification are usually the same on both sides.

Another point to be observed in the roentgenogram is that the posterior contour of the growing os calcis in the lateral view appears irregular, indented, and wavy. This appearance, too, may be misinterpreted as a fracture.

In children, as in adults, two general types of fractures of the os calcis can be differentiated: avulsion



Fig. 2. Case 2. Interpretative drawing of lateral roentgenogram of os calcis of child, aged three years. Arrow indicates site of fissure fracture.

fissure fractures. In crush fractures there is extreme comminution of the bone with flattening and lateral spreading. Fissure fractures may be comminuted, but there is no displacement of fragments.

Report of Cases

Case 1.—R. B., white, male, aged five years. This patient was treated by the author at the Northwestern Hospital in Minneapolis, where he was admitted on December 8, 1937. One day prior to admission he had jumped ten feet from the roof of a garage to the frozen ground. The left foot became swollen and discolored below both malleoli. Palpation of the heel caused severe pain. A roentgenogram (Fig. 1) showed a fracture of the left os calcis with lateral displacement and slight spreading. There was no apparent flattening nor loss of the normal tuberosity-joint angle.

The foot was elevated for four days to diminish the swelling, after which the heel was manipulated under ether anesthesia. A moderate amount of compression was made on each side of the heel with the os calcis clamp, resulting in excellent reduction. A slightly padded circular cast which was well moulded beneath the malleoli was applied from below the knee to the toes. The cast was removed three weeks after its application. A roentgenogram showed the fracture at this time to be united in good position. Partial weight bearing was begun two weeks later. Two months after the injury there was complete return of function with no permanent disability.

Case 2.—J. F., white, male, aged three years. This patient is the son of Dr. John M. Feeney of Minneapo-

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lis, who treated him at the Northwestern Hospital in August, 1938, and permitted the case to be reported in this paper. While riding on his brother's back, the child had fallen and struck his right heel on the floor. A roentgenogram (Fig. 2) showed a fracture line extending transversely through the long axis of the os calcis. There was no displacement or impaction. A circular cast was applied from below the knee to the toes. Three weeks later the cast was removed, and in another three weeks full weight bearing was resumed. The function of the foot was normal.

Comment

Five of the eight children who were treated at the Minneapolis General Hospital were observed three to nine months after discharge from the hospital. These five children had good functional results with no permanent disability, although in two instances the fractures healed in malposition. Yoerg's method of reduction produced excellent anatomic and functional results.

Conclusion

In children, fractures of the os calcis occur which are similar in type to those in adults. Such fractures usually result from a fall from some object several feet in height. This fracture is rare in children less than ten years of age but not uncommon in children between ten and fifteen years of age. Two cases in children less than six years of age are reported.

Bibliography

1. Bode, P.: Der Fersenneinbruch, eine typische Verletzung des Bauarbeiters. *Arch. f. Orthop. u. Unfall-Chir.*, 37:649, 1937.
2. Cahill, G. F.: Fractures of the os calcis. *Ann. Surg.*, 66: 711, (Dec.) 1917.
3. Cotton, F. J.: Dislocations and Joint Fractures. Second edition. Philadelphia: W. B. Saunders Company, p. 685, 1924.
4. Gray, H.: Anatomy of the Human Body. Twenty-second edition. Philadelphia: Lea and Febiger, p. 271, 1930.
5. Köhler, A.: Roentgenology, English translation of the fifth German edition. New York: William Wood and Company, p. 128, 1929.
6. Yoerg, O. W.: Personal communication to the author.
7. Yoerg, O. W.: Os calcis fractures, an improved treatment. *Surgery*, 2:493, (Jan.) 1937.

Discussion

DR. OTTO YOERG: I have enjoyed hearing Dr. Anderson's paper. Fractures of the os calcis account for about 2 per cent of all fractures. Most of them occur in the forties and fifties, and are more common in the working man, who is subjected to the danger of falling from a height. The fracture, however, can occur at any age but rarely occurs in the young.

Dr. Anderson's case is of interest as I have been unable to find in the literature a fracture of the os calcis in a child five years old.

Fractures of the os calcis may occur from other causes. I made a reduction on a man at the General Hospital who was struck by a car. He was thrown to the pavement and slid along on the pavement striking his heel forcibly on the curb. Another case was that of a young woman who was riding in the front seat of a car that was involved in a head-on collision. The impact of the heel on the footboard produced a badly comminuted fracture of the os calcis.

The bones in children are soft and pliable, as Dr. Anderson stated. This undoubtedly accounts for so few fractures in children, as certainly every child delights in jumping from a height.

Fractures of the os calcis in children are, fortunately, not severe, and there is seldom a crushing of the posterior joint surface. The end-result in youngsters is much better and convalescence shortened. Disability very rarely results.

LYMPHOSARCOMA OF THE ILEUM

Report of a Case

W. H. RUCKER, M.D., F.A.C.S. (by invitation)
Minneapolis

Primary lymphosarcoma of the intestine is rare. Staemmler, in 1923, checked 54,000 autopsy records from German and Austrian hospitals and found only thirty-three cases. Margaret Smith discovered only three lymphosarcomas involving the intestines and only one of the small intestine in about 18,000 autopsies recorded at the University of Minnesota from 1928 to 1938. Ullman and Abeshouse, after an exhaustive study of the literature in 1932, included one case of their own and noted 375 cases. In checking over the literature from 1932 to date there are approximately thirty-five isolated cases recorded, making a total of 410 cases.

Lymphosarcomata are malignant tumors originating in lymphatic tissue and composed of lymphocytic cells in small amounts of reticulum. They infiltrate the local tissues and metastasize to the regional lymph nodes.

In the bowel they arise in the submucosa and grow towards the serosa, invading the muscularis. They very rarely penetrate the serosa and only cause ulceration of the mucosa through pressure, loss of blood supply and necrosis.

They begin as indurated areas in the intestinal wall and are likely to follow around the wall, forming a tubular growth and causing a constriction of the lumen. Many times, however, by weakening the muscular coat they cause an aneurysm of the gut. Polypoid growths may develop within the intestine. From the primary growth in the gut wall the tumor soon extends to the lymph glands in the mesentery and in the late cases by way of the blood stream to distant organs.

Paralleling the lymphoid distribution in the intestines, these tumors are twice as common in the small intestine as in the large and occur most frequently in the region of the ileocecal valve. They have a predilection for the first, second and fourth decades of life but have been reported from birth to 85 years. They favor the male 5 to 2 and the white over the negro 7 to 1.

The etiology of this neoplasm is unknown. However, a number of cases have been reported in which it has followed blows and injuries to the abdomen. Arising as it does most often in the region of the ileocecal valve where there is a large amount of lymphoid tissue and where there is a stasis or slowing of the bowel stream, one might easily theorize that infection and trauma could play a definite rôle. The leukocytosis and increased polymorphonuclear count which is practically always present would also seem to substantiate this thought. Desjardins, in his observation of a large number of cases of lymphosarcoma, has found it closely associated with chronic infection and feels that this may be the causative factor.

The symptoms are most often those of obstruction or appendicitis. The laboratory findings commonly disclose a moderate leukocytosis, an increased polymorphonuclear count and some grade of anemia. The

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x-ray gives no definite picture but may suggest malignancy. The tumor can rarely be differentiated from carcinoma. Treatment depends upon the stage of metastasis. If early, radical resection, followed by

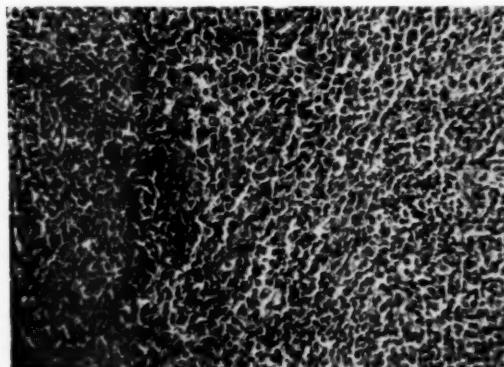


Fig. 1. Microscopic section through lymph gland showing lymphocytic cells filling the gland entirely and destroying the normal gland structure.

Since the attack of kidney trouble at five years she has had no symptoms pointing to genito-urinary disease.

Menses began at fourteen, have occurred at twenty-

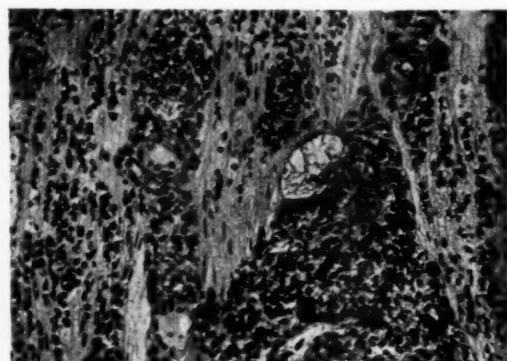


Fig. 2. Microscopic section through tumor showing lymphocytic cells invading the muscularis.

roentgenotherapy. If late, deep x-ray therapy. The prognosis is unfavorable. Early operation followed by x-ray therapy gives hope of a five-year cure in one out of eight or nine cases.

Case Report

This is the case of a white unmarried girl of English-German descent, nineteen years of age, unemployed and living with her parents. She was admitted to Northwestern Hospital during the evening of October 19, 1938.

History of Present Illness.—For the past three weeks she had had attacks of nausea and vomiting with indefinite pain in the upper abdomen, which were present during the day but were not so severe as to keep her awake at night. The type or amount of food she ate seemed to have little or no effect. She performed her duties at home as usual. One week previous to admittance to the hospital her doctor found no elevation of temperature and no definite diagnosis was made. An alkaline mixture was prescribed and she was given a soft diet. She was somewhat relieved but on October 19 she awoke in the morning with abdominal cramps, vomiting severely with each pain. These attacks at times were only 5 minutes apart and she thought she had vomited at least twenty times. Her bowels moved normally, twice during the day.

Past History.—As a child she had measles and whooping cough. At five years of age she had "kidney trouble" and was treated for three weeks. Following this, she had an abscess in the axilla. During the same year her tonsils and adenoids were removed. Since then her general health has always been good. She has never had any major operations nor does she remember any injuries to her abdomen.

Her appetite has always been good, her bowels move normally and she has had no food aversion or distress. She has never noticed blood in the stools. On careful questioning she stated that during the past year she had had a considerable number of vomiting spells, sometimes twice a week and then not again for two or three weeks. She says she considered it a habit and thought nothing of it.

LYMPHOSARCOMA OF THE ILEUM

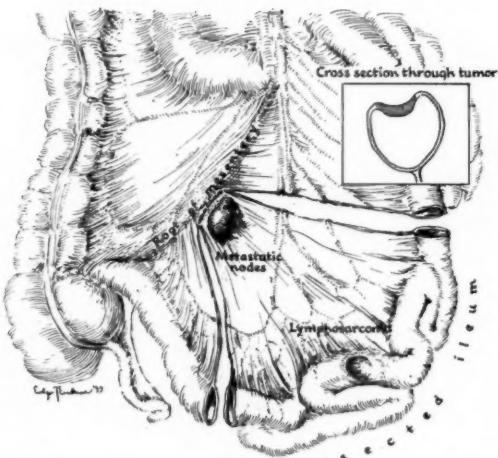


Fig. 3. Drawing showing the location of the tumor and metastatic nodes and the length of ileum, with its mesentery resected.

eight-day intervals, and lasted five or six days. She has had no vaginal discharge.

There has been no noticeable loss of weight.

Family History.—Her father, mother and two sisters are living and well. There have been no deaths in the immediate family and there have been no malignancies in any blood relatives.

Physical Examination (Oct. 20, 1938).—Temperature 98.4°, pulse 78, blood pressure 118/65, respiration 20.

A young, well nourished female, lying in bed, evidently not in pain, with rough papillary acneiform lesions on the face. Head, neck and chest were normal.

The abdomen was soft but there was a moderate

TRANSACTIONS OF THE MINNEAPOLIS SURGICAL SOCIETY

tenderness on the left side, most marked just above the umbilicus. There was no rigidity, muscle spasm or mass palpable.

On entrance to the room, October 21, 1938 (9:00 a. m.), I found her in distress. She stated that the pain had localized in the right lower quadrant and had been severe since early in the morning. She had had nothing by mouth during the previous day and had been given proctoclysis and there had been no vomiting.

The abdominal picture had changed completely. She was exceedingly tender over McBurney's point and over the entire right lower quadrant. There was definite muscle spasm and marked rigidity. A diagnosis of acute suppurative appendicitis was made.

Laboratory Findings.—White blood count 10/19/38, 16,250 (on admittance); 10/20/38, 12,500; 10/21/38, 12,600 (day of operation); 10/24/38, 7,800. Wassermann: negative. Hemoglobin—10/20/38, D. 68 per cent; N. 70 per cent. Red blood count, 10/20/38—3,530,000; differential: polynuclears 72 per cent, large mononuclears 8 per cent, lymphocytes 20 per cent. Urine: negative except for slight albumin.

Operation.—Operation was performed October 21, 1938, at 11:15 a. m., using gas and ether. The abdomen was entered through a right rectus incision. The appendix was located and inspected. It was injected and showed a mild degree of inflammation, not enough in our estimation to account for the pre-operative picture. Further exploration found no abnormalities in the stomach, duodenum, gallbladder, or pelvic organs. However, a lump the size of a walnut was encountered in the mesentery of the ileum. On inspection of the gut opposite to this, an indurated area was found in the apex of its wall, at a point 18 inches from the ileocecal valve. The area or plaque was the size and shape of a large overcoat button and caused a dimpling of the gut. It was whitish in color and moderately hard. A section was taken from the gland from which a definite diagnosis could not be made. At Dr. Yoerg's suggestion intestinal clamps were then placed on either side of the tumor and a biopsy of the tumor itself was made. When the diagnosis of malignancy

was reported a resection of 24 inches of small gut was made, removing the tumor and the mesenteric nodes, and a side-to-side anastomosis established. There was a stub of six inches of ileum left proximal to the ileocecal valve.

The wound was closed in layers and two tension sutures were used in the fascia.

Pathological Report.—**Gross:** Specimen consists of a section of the small bowel with a round ulcerated area approximately 2 cm. across. The edge is moderately smooth and the base is very firm but a little bit soft and light colored. In the mesentery are three large glands. **Microscopic:** Sections through the intestinal tumor show dense masses of cells resembling those of germinal centers. These are invading the mucosa and muscularis markedly. The normal gland structure is lost and this same type of cell fills the glands entirely. The mitoses are very numerous. There is a suggestion of reticulum. The mucosa at the edge is markedly polypoid.

Diagnosis: Lymphosarcoma of the germinal cell type.

Post-operative Course.—Nasal decompression was used for one week. The wound healed by primary intention and the patient made a most uneventful recovery. She remained in the hospital fourteen post-operative days, left with her bowels moving normally, on a soft diet and in no distress of any kind.

She remained at home ten days and then was referred to the x-ray department for deep therapy.

When seen at the office May 1, 1939, five months after operation, she had gained ten pounds in weight, appeared in excellent health, was having no gastrointestinal symptoms, nor was there any evidence of recurrence of the tumor.

Summary

A case is described in which the clinical picture and laboratory findings were strongly indicative of acute appendicitis but which at operation proved to be a small primary lymphosarcoma of the wall of the ileum, with involvement of the adjacent mesenteric lymph nodes.

BOARD OF MEDICAL EXAMINERS

List of Physicians Licensed

(Continued from page 857)

Stromme, William Brown—U. of Minn., M.B. 1939, Minneapolis.
Studer, Donald James—U. of Minn., M.B. 1938, Minneapolis.
Subby, Walter, Jr.—U. of Minn., M.B. 1939, Saint Paul.
Travis, James S.—Rush Med. Col., M.D. 1938, Fargo, N. D.
Trimingham, Hugh Gerald—Loch-McGill, M.D. 1937, Rochester.
Weible, Ralph Darrow—U. of Minn., M.B. 1938, Minneapolis.
Wellner, Theodore Otto—U. of Minn., M.B. 1939, Minneapolis.

Wood, Benjamin J.—U. of Pittsburgh, M.D. 1938, Rochester.

Wozencraft, Jean Paul—U. of Cincinnati, M.B. 1938, M.D. 1939, Rochester.

Wright, Donovan George—U. of Minn., M.B. 1938, M.D. 1939, Minneapolis.

By Reciprocity

Adair, Albert Franklin, Jr.—U. of Tenn., M.D. 1934, Saint Paul.

Anderson, David Perrin, Jr.—U. of Pa., M.D. 1934, Austin.

Kent, Herbert Knight—Loyola U., M.D. 1929, Lansing.
Kisner, Paul—Washington U., M.D. 1935, Minneapolis.

National Board Credentials

Clapp, Stewart—Geo. Wash. U., M.D. 1937, Chevy Chase, Md.

PROCEEDINGS OF THE MINNESOTA ACADEMY OF MEDICINE

Meeting of October 11, 1939

The regular monthly meeting of the Minnesota Academy of Medicine was held at the Town and Country Club on Wednesday evening, October 11, 1939. Dinner was served at 7 o'clock and the meeting was called to order by the president, Dr. Carl B. Drake, at 8:10 p.m.

There were fifty-three members and four guests present.

Minutes of the May meeting were read and approved.

Dr. Herbert Jones, of Minneapolis, read the following Memorial to Dr. Chester M. Carlaw, and a motion was carried that it be spread on the minutes of the Academy and a copy sent to the family.

Chester Milton Carlaw

1865-1939

Dr. Carlaw was born in Toronto, Ontario, Canada, on June 5, 1865. His father, Major John A. Carlaw, was of Scotch Presbyterian ancestry. Both his father and grandfather were distinguished citizens of Toronto and were very active in the civic, commercial, and religious affairs of the city. His mother, Susanna Chester, was of English descent and came from Montreal, Canada.

Dr. Carlaw was educated in Guelph College and graduated in 1883. He then went to Albert University in Belleville, Ontario, graduating in 1887. He continued his course at McGill University in Montreal, from which college he was graduated in 1891. He was licensed in New York and Minnesota and came to Minnesota in 1891 to enter the practice of medicine.

He was married on August 5, 1891, to a daughter of Dr. Irwin Dorland Bogart of Campbellford, Ontario.

Dr. Carlaw was a member of Asbury and Northwestern Hospital Staffs, Hennepin County Medical Society, Minnesota State Medical Society, American Medical Association, and also the Minnesota Academy of Medicine. He was a member of First Presbyterian Church in Minneapolis.

During his entire life Dr. Carlaw was intensely interested in agriculture and spent his leisure time in gardening and raising fine livestock.

Dr. Carlaw was a valued member of this community. His kindly, genial disposition endeared him to his patients; and his candid, honest opinions brought him the respect of the medical profession. He died on January 7, 1939, after a long life devoted to the alleviation of suffering.

The Necrology Committee,
HERBERT JONES, M.D.

The Secretary read a letter from Dr. J. T. Christison, of Saint Paul, asking that his name be transferred to the Senior Membership list. This had been approved by the Executive Committee. Voted on and accepted by the Academy.

The scientific program followed.

Dr. Lee W. Barry, Saint Paul, read his inaugural thesis entitled "A Brief Historical and Technical Review of Cesarean Section." (To appear later in MINNESOTA MEDICINE.)

VOLVULUS OF THE COLON*

Report of Two Unusual Cases

A. E. BENJAMIN, M.D.
Minneapolis

Volvulus of the colon constitutes about 10 per cent of the cases of obstruction of the bowel. The sigmoid is most frequently affected, the transverse colon and cecum less often. It may occur in the acute form or there may be a history of recurring attacks with symptoms of obstruction of the bowels ending in a positive torsion of the bowel and complete obstruction.

James A. Cahill, Jr.¹ states that "chronic intestinal stasis with traction on the mesentery predisposes to this condition." Volvulus of the colon has been attributed to constipation, congenital bands, a long mesentery, adhesions, rough diet, appendicitis, and former operations.

Ladd² states that in instances in which the development has been arrested before the parietal and visceral peritoneum were fused, the mid-gut remains attached to the posterior abdominal wall by only a very small area at the origin of the superior mesenteric artery. Under these circumstances, a volvulus of the mid-gut is particularly liable to develop.

Incomplete rotation of the right colon or cecum mobile may be causes. James³ reports a case of interest not only from the point of view of the youth of the patient but also because it presented itself as an acute obstruction on the ninth day after an otherwise uncomplicated appendectomy.

It is an affliction of middle life mainly, and its incidence in male and female is about equal up to twenty years of age. It occurs about four times as often in men as in women after twenty years of age, probably due to less space for the bowel in men and the character of the diet eaten by the male. There is gas and fluid distention of the loop involved and often gas distention of the proximal intestine. The ileocecal valve occasionally prevents the regurgitation of gas into the small intestine, however. The circulation, when interfered with, results in a serosanguinous abdominal exudate and constitutional symptoms. The twist is usually clockwise and may be from 90 to 720 degrees. When on the right side, a reverse twist occasionally occurs.

The mortality of torsion of the intestine is recorded as about 50 per cent but is greatly increased when necrosis occurs and resection becomes necessary.

The symptoms of torsion of the colon are those of obstruction. They are modified according to the location, duration, and degree of the obstruction. In the chronic form there have been former attacks of abdominal pain, constipation alternating with diarrhea, with attacks of nausea and vomiting, distention of in-



Fig. 1. Case 1. September 3, 1938. The large air-distended segment of bowel in the upper abdomen is the proximal part of the colon. At this time this was erroneously interpreted as being distension of the stomach.



Fig. 2. Case 1. September 9, 1939. Marked air distention of the intestinal tract. Two loops of bowel in the upper abdomen are markedly distended.



Fig. 3. Case 1. September 9, 1939. Barium enema examination shows the twisted appearance of the proximal part of transverse colon. This corkscrew-like twisting of the bowel is apparently characteristic of volvulus.

testinal loops, and obstructive signs. The symptoms may resemble those of internal hernia, mesenteric thrombosis, pancreatitis, intestinal adhesions, appendicitis, diverticulitis, torsion of the broad ligament or pedunculated cyst.

The diagnosis is less difficult when an x-ray plate is taken before and after a barium enema. Nasal suction should be instituted early as it facilitates the diagnosis and lessens the discomfort of the patient. Intravenous glucose and saline should be used in every case of obstruction until a diagnosis is made or relief is given. The mortality may thus be greatly reduced.

Surgical treatment should not be postponed, even though the patient seems comfortable after using nasal suction, if the x-ray shows complete obstruction, no gas is expelled, and the distended loop is not decreased.

Grace² states as follows:

"A survey of the literature shows that some three to five cases of volvulus of the cecum are reported each year; practically all of these are in foreign journals. The comparative rarity on this continent may be judged from the fact that Sweet, when reporting a personal case, was able to locate records of only six cases in the Massachusetts General Hospital in a period of 57 years; this means approximately one example of the acute and recognized variety each ten years on the average. It has not been possible to find any record of a single case in London (Ontario), either among the records of the Victoria Hospital or from a personal canvass of a number of surgeons and pathologists."

Leonard and Derow³ report as follows:

"A volvulus of the cecum and ascending colon that had been operated on fifteen years previously for a volvulus of the same portion of the colon. This patient succumbed after a Mikulicz operation. There were three other cases of involvement of the ascending colon and cecum. Two of these were treated by simple untwisting. In the third there was a recurrence four months after operation. At the second operation it was deemed necessary to resect the involved portion."

On account of the comparative rarity of right-sided volvulus of the colon, I desire here to report a unique case of volvulus of the cecum, ascending and part of the transverse colon; also a second unusual case of volvulus of the sigmoid and part of the descending

colon; and to contrast these two forms of torsion of the colon.

Cases

Case 1.—Mrs. M. P., white, aged seventy-six, housewife, was admitted to the hospital September 9, 1939. Her height was 5 feet 4½ inches and weight about 185 pounds. Her eyes, ears, nose and throat, as well as heart and lungs, were normal. The abdomen was unusually prominent and greatly distended, with much adipose tissue in the abdominal wall and gas in the intestine.

Parents are both dead. One brother is living, but has tuberculosis. Two sisters are living and well. Her husband is living, but has asthmatic attacks. Three children are living and well.

The patient had measles as a child; influenza in 1932; hernia operation in 1914. She broke her right leg above the knee in 1928 and while in the hospital had a severe attack of abdominal cramp, constipation and diarrhea. A tumor was removed from the back of the right knee several years ago. In 1934 she complained of a painful area and a small mass in the right breast which had been present about a month. There was some discharge from the nipple. The tumor and axillary glands were removed in March, 1934; the pathologist's report was medullary carcinoma. The wound healed very slowly, with considerable discharge from the wall of fat breaking down. Several deep x-ray treatments were given, and to date there is no sign of recurrence.

While in the hospital she became constipated and complained of abdominal distention, pain and vomiting, followed by diarrhea. She gradually recovered and remained comparatively well until September 1, 1938, when she sustained an intertrochanteric fracture of the right hip. There was moderate upward displacement of the lesser trochanter; otherwise the fragments were in good position. The third day in the hospital she began to complain of gastric distress with nausea and vomiting. Intravenous glucose and salines, surgical pituitrin and nasal suction were instituted.

Radiographs of the abdomen (Fig. 1) on September 3, 1938, showed marked distention of the stomach with air and also considerable air distention of the intes-

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tinal tract. The findings were those of a paralytic ileus. She continued to have more or less gastric distress until the tenth hospital day, when the symptoms gradually subsided. The patient was discharged after eighty-nine days in the hospital. She got around at home very well, on crutches.

While at home the patient experienced a severe attack of unilateral herpes zoster along the course of the right twelfth dorsal nerve, and the eruption extended from the spine downward and forward over the front of the abdomen for about twenty-four inches. Recovery from this was slow and painful, the eruption lasting about four months. During the latter stages of that complaint she experienced another attack of extreme constipation, pain and distention of the abdomen, with nausea and vomiting and, later, diarrhea. The symptoms were those of bowel obstruction, but, being averse to going to the hospital, some chances were taken. She finally recovered, except that her abdomen was unusually large from what seemed to be a thick-walled distended colon, and considerable pain was occasionally experienced in areas along the upper right abdomen where the herpes had affected her. She was up and about on crutches and occasionally went out riding.

On September 6, 1939, she began to have some abdominal pain which she attributed to food taken the evening before. She had been an unusually heavy eater and ate rich and coarse foods occasionally, and did not heed past warnings in regard to her diet. Her symptoms gradually became worse. She sought the advice of a physician late the next day and had a nurse try to relieve her by means of enemas. Very little gas was obtained. She had vomited considerably on the first and second days but this ceased the third day and the pain was less pronounced. Little or no gas or bowel evacuations occurred. The abdomen was distended and the percussion note was dull and tympanitic as of a thick-walled distended bowel. She was persuaded to go to the hospital, which she did early on September 9. She was much dehydrated; nasal suction was immediately started, as well as intravenous glucose and saline. These were continued until the fifth postoperative day. A flat radiograph of the abdomen (Fig. 2) and a barium enema (Fig. 3) showed that an obstruction existed at what seemed the hepatic flexure, possibly due to volvulus or adhesions. There were multiple diverticula of the sigmoid but no evidence of tumor. An operation was advised soon after these findings were noted, and, the patient being in fair condition, it was performed early on September 10, 1939, at St. Barnabas Hospital. At this time her temperature was 98.5°, pulse 85, regular and of fair volume. The urine showed a trace of albumin. The blood pressure was 180/145.

Nitrous oxide and ether and local anesthetic were used. At operation, the ascending and proximal half of the transverse colon were distended to a diameter of 5½ inches with a volvulus of about 540 degrees and a band 1½ inches wide constricting the mid-portion of the transverse colon. Blood and serum were found in the abdomen. The appendix was retrocecal and the gallbladder was apparently normal. The cecum was found in the upper left quadrant of the abdomen. (Alexius McGlonnan⁶ states that the cecum may be found in any part of the abdomen.) Gas was removed from the distended colon with a needle. The obstructing band was cut and the volvulus untwisted. The cecum was brought up into the lower wound, sutured to the peritoneum and the rest of the wound closed with No. 1 chromic catgut for peritoneum and fascia, stay sutures also for the fascia, and dermal for the skin. Vaseline strip dressing was applied and a large catheter sutured into the cecum.

The patient's general health began to improve directly following the operation. The cecum was washed out

several times a day for a few days. It was a large, thick-walled ball about 5 inches in diameter when first anchored part way out of the abdomen upon the theory that it would gradually shrink and could be safely returned to the abdomen, or, if it did not shrink, it could easily be removed. The catheter was removed in six days and the colon was kept empty by irrigations. The protruding cecum shrank to about 5 centimeters in diameter, its wall became less edematous and looked healthy. Her temperature was never over 101.5°, most of the time was 99°, and returned to normal. Her blood pressure gradually came down until it was 112/55. Her leukocyte count was 8,400 on September 11. Her hemoglobin was 62 per cent about the time of operation and then became about 70 per cent. The urine contained 1 plus sugar on September 11, two days after operation, but this disappeared.

Case 2.—This case is one that compares favorably with the first in interest and unusual findings, with the left side of the abdomen involved.

Carl S., aged seventy-three, married, is a real estate operator. His height is 5 feet 10 inches; weight 150 pounds. His habits are good.

He had "grippe" in 1890 and influenza in 1918; measles as a child; fracture of the right wrist in 1908; and a broken arm in 1930.

He came to me in 1935, and gave a history of having had more or less intestinal disturbance. As early as 1905 he complained of constipation and alternate diarrhea; he lost considerable weight, and there was more or less pain and distention in the abdomen not always relieved by enemas. He had used an enema tube connected with the water faucet to get sufficient pressure to get a bowel movement. There was no blood in the stools. In September, 1935, he had had pain in the abdomen for two weeks, with nausea and vomiting and considerable belching. The abdomen had been distended for two days and he had had no bowel movement for four days. He was sent to St. Barnabas Hospital. Radiographs were taken on September 13, 1935, before (Fig. 4) and after a barium enema (Fig. 5), and showed tremendous dilatation of the sigmoid colon, the diameter being approximately 6 inches. Above this there was moderate dilatation of the colon and no appreciable dilatation of the small intestine. There was obstruction of the colon in the lower half of the sigmoid and the appearance of the lumen in this region was that of a volvulus. There was no evidence of new growth.

Examination in September, 1935, revealed essentially negative findings except that the abdomen was distended and tympanitic and markedly tender. No masses were palpable. The skin was pale and moist.

Laboratory: urine, amber, sp. gr. 1.022; albumin, trace; sugar, green reduction; microscopic: occasional pus cell, few blood cells, few epithelial cells. Blood pressure 182/96. Hemoglobin 74 per cent (Sahli); leukocytes, 9,800. Wassermann negative.

At operation, September 13, 1935, a median incision was made. There was found an obstruction of the colon above the rectum, due to volvulus, with dilatation of the sigmoid, ascending, transverse and descending colon to a marked degree. About a full turn of gut (360°) was found, but not complete obstruction to the circulation. The bowel was dilated to about 5½ inches in diameter, resembling a megacolon. Wangenstein⁷ states that in most instances in which volvulus of the sigmoid occurs, an unusually large bowel or pseudo-megacolon with a long mesentery is present.

Gas was removed from the colon with a needle and a rectal tube was passed into the gas pocket after untwisting the colon. Puncture made into the colon was closed with a Dulox purse-string. A rectal tube was left in situ, and the abdomen closed.



Fig. 4. Case 2. September 13, 1935. Volvulus of sigmoid colon with tremendous air distention of the sigmoid loop. The colon proximal to the volvulus is moderately distended with air and feces. In chronic volvulus the caliber of the distended bowel is much larger than is observed in other obstructive lesions.

Fig. 5. Case 2. September 13, 1935. Barium enema examination shows the twisting of the recto-sigmoid which is characteristic of volvulus.

Fig. 6. Case 2. October 26, 1937. Two years after surgical correction of the volvulus, the patient returned and was found to have recurrence of the volvulus. The caliber of the distended sigmoid was larger than was observed in 1935.

The patient had a temperature of 101.8° and pulse 98 the first postoperative day. Temperature 102.6° and pulse 84 on the sixth postoperative day, gradually came down to normal on the seventeenth postoperative day. Several glucose and saline intravenous injections were given after operation. Urine specimens showed faint traces of albumin, a few epithelial, pus and blood cells following operation.

On September 28, 1935, a roentgenogram was made in the antero-posterior direction of the abdomen. There was still evidence of a moderate amount of air in the intestinal tract and this was largely in the colon. The distribution of the air had the appearance of relative adynamic ileus and not obstruction.

The patient remained in comparative good health until September, 1936, when he began having swelling of the ankles, and constipation followed by looseness of the bowels for two or three days. Urine showed a trace of albumin, occasionally epithelial cells and clumps of pus cells. His blood pressure was 124/78, temperature 98.6°, pulse 80. There was a slight murmur of the heart at the apex. The patient had deep-seated varicosity of the legs. The urinary trouble cleared up with urinary antiseptics; bandage to the legs and rest brought improvement. He gained in weight and felt well until October, 1937, when he began having a recurrence of abdominal pain, distension and bowel obstruction. The colon was greatly distended on account of obstruction at or near the sigmoid. His blood pressure at this time was 148/100; urine, acid, few epithelial cells, pus cells 1 to 2 per high-power field.

A radiograph taken October 26, 1937 (Fig. 6), showed a complete obstruction apparently involving the left side of the colon. There was an extremely large loop of gas-filled colon on the left side and distension of the colon proximal to this area but to a much less degree. These findings are fairly typical of volvulus with marked distension of the obstructed loop.

Operation was performed on October 26, 1937. A median incision was made through the old scar, and the abdomen explored and colon followed up its entire length. A megacolon was found obstructed at the upper region of the sigmoid with extreme dilatation of the descending colon and sigmoid about 7 inches

in diameter, with a twist at the mesentery forming a volvulus of 360°. The distention was so great that when the loop was relieved of the pressure of the retaining abdominal wall the serosa broke apart in places. The appendix was enlarged but not inflamed. The gallbladder was apparently normal. Gas was let out of the distended loop with a large needle and the volvulus untwisted. A clamp was placed at the upper and lower portion of the redundant and distended loop. The abdominal wall was closed around and below these clamps. The distended loop about 15 inches long was brought over to one side of the abdomen. This loop was removed with cautery the third day following operation. The clamps were gradually loosened. Post-operative treatment consisted of glucose and saline. Temperature was 103° and pulse 120 on the third post-operative day; then gradually came down to normal. On November 9, 1937, a Payers clamp crushed the contiguous walls of the proximal and distal loops of the colon and left in place for three days.

Laboratory report of the tissue removed—about 15 inches of large bowel resected—was as follows: It is greatly dilated (megacolon) filled with gas, blood, serum and liquid fecal matter. The walls are thick with much hemorrhage in the walls. There is considerable necrosis and the mucous membrane is thin. Diagnosis: Megacolon with necrosis of the bowel.

Examination of the urine while in the hospital showed it to be acid 1.003 sp.gr., albumin 0, sugar 0, 20-25 pus cells per high-power field. Hemoglobin 60 per cent.

The patient was irrational at times and had chills, but complained of no pain. The colostomy worked and he had a normal liquid stool. Usually gas and contents escaped from the colostomy opening.

On November 23, 1937, he had a vein ligation on account of the varicose veins of the right leg which bothered him considerably. He convalesced satisfactorily. The colostomy opening worked very well and from the eighth postoperative day he had a normal convalescence. He was discharged from the hospital on November 30, 1937.

After leaving the hospital he had normal bowel movements but some fecal matter passed through the colostomy opening. He gained considerable weight.

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His blood pressure was 132/80; hemoglobin 80 per cent. His condition was very good, with no trouble until December, 1937, when he began having some difficulty in evacuating the bowel and considerable protrusion of bowel through the colostomy opening. On January 3, 1938, he was sent to the hospital to have another operation.

On January 4, 1938, the descending portion of the remaining colon protruded through the colostomy opening, obstructing the lumen. The colon was redundant at the distal loop. A left rectus incision was made to the right of the old incision, and loops of colon above and below the opening were anastomosed laterally. The old opening was left. The abdomen was closed in the usual manner. His temperature was 99.0°; pulse 108. Urine: acid, sp.gr. 1.010, albumin 0, sugar 0, 4 to 5 pus cells. Hemoglobin 88 per cent.

Nasal suction was instituted after operation on account of nausea and vomiting, and left in for twelve days. Thereafter he had a normal convalescence, and left the hospital on February 8, 1938.

On April 1, 1939, he felt fine, weighed about 156 pounds, and he had two movements a day through the colostomy opening. There was some bleeding from the opening. His blood pressure was 160/80; temperature 98°; hemoglobin 80 per cent. On April 13 the urine was acid, faint trace of albumin, sugar 0, microscopic negative.

The side anastomosis between the remnant of the descending colon and rectum finally did not function well; consequently the colostomy has not been closed. He wears a special pad to the opening and has established quite a satisfactory regularity of bowel action. He remains in good health; in fact, he stated not long ago that he never felt better, and he has no constitutional trouble that obtained when he was constipated before his operations. He goes about his daily duties with no difficulty, has a good color, his kidneys are in a healthy state, and he seems to enjoy life. He is quite a philosopher and does not mind the inconvenience of the colostomy; in fact, he has not yet been persuaded to have another operation to close the colostomy.

Interesting points in connection with these two cases are:

1. The chronicity, or preceding attacks, of constipation, abdominal distention, cramp-like pains, and, later, diarrhea, with intervals of fairly good health.
2. The dilatation of the bowel and extent of the colon involved.
3. The large firm band present in the first case.
4. The rupture of serosa when pressure was relieved in the second case.
5. Thickness of the intestinal wall in both cases.
6. The amount of necrosis in the second case.
7. The presence of sugar in the urine in both cases at the time of operation and entire disappearance since.
8. The hypertension at the time of operation and reduction at the present time.
9. The great improvement in general health of both patients, and normal bowel action.
10. Two operations performed for the same trouble in the second case.
11. Diverticulosis in the first case.
12. The preceding and associated affections in the two cases.

Bibliography

1. Cahill, James A., Jr.: Anomalies, injuries, of the colon. Textbook of Surgery by Christopher. 2nd Ed. Saunders. p. 1162.
2. Grace, A. J.: Volvulus of the cecum; report of two cases. Canadian Med. Assn. Jour., 38:346, (April) 1938.
3. James, K. L.: Volvulus of pelvic colon in a young person; unusual complication of appendectomy. Brit. Med. Jour., 2:569, (Sept. 10) 1938.
4. Ladd, William E.: Congenital obstruction of duodenum in children. New England Jour. Med., 206:277, 1932; also Jour. Am. Med. Assn., 101:1453, 1933.
5. Leonard, Edward D., and Derow, Sidney: Volvulus: a study of twenty-two cases. New England Jour. Med., 218: 388, (March 3) 1938.
6. McGloinan, Alexius: Lewis' Surgery, Hagerstown, VII, 4:22.
7. Wangensteen, O. H.: The therapeutic problem in bowel obstructions. Springfield, Ill.; C. C. Thomas, 1937.

Discussion

DR. RUSSELL MORSE, Minneapolis (by invitation): In making a roentgenologic diagnosis of ileus, one is often able to make a differential diagnosis as to the type of ileus and its cause. Under normal conditions the air or gas content of the intestinal tract is small in amount and not sufficient to cause a definite dilatation of the intestine. The normal air content of the small intestine is very slight and is irregular in its distribution. In the colon the air or gas is normally more abundant but is not sufficient to produce dilatation of long segments of the colon. In the study of any case which shows air distention of the colon, with or without air distention of the small intestine, it is safe and advisable to study the colon by means of a barium enema in order to rule out an organic obstruction in the distal part of the colon.

When adynamic (paralytic) ileus occurs, there is gradual accumulation of air throughout the intestinal tract, and there is an equal or proportionate dilatation of the colon and small intestine. A barium enema study safely rules out organic obstruction of the colon.

In dynamic (obstructive) ileus there will be gradual accumulation of air in the intestinal tract proximal to the point of obstruction. The relative involvement of the colon and small intestine will vary with the level of the obstruction. When the obstruction is in the small intestine there will be no dilatation of the colon, although air may be visualized which was present in the colon before the obstruction occurred. If there is dilatation of the colon, the obstruction must be in the colon and a barium enema study will safely disclose the site of the obstruction.

Air distention of the bowel means that there is retention of peristaltic activity. In two conditions we find a diminished air content for quite a period of time. These are mesenteric thrombosis and strangulation of the bowel. In these conditions the shock of the accident must be sufficient to abolish peristaltic activity.

From the roentgenologic study of the two cases presented by Dr. Benjamin, we are able to postulate two findings on which one can make a presumptive diagnosis of volvulus of the colon: (1) the tremendous size of the dilatation, the dilated bowel attaining a transverse diameter of from 10 to 20 centimeters; and (2) the actual corkscrew appearance of the lumen of the colon at the point where it is twisted and as shown by means of the barium enema. These two findings can help us many times in the differential diagnosis.

The meeting adjourned.

A. G. SCHULZE, M.D.
Secretary.

BOOK REVIEWS

BOOK REVIEWS

Books listed here become the property of the Ramsey, Hennepin and St. Louis County Medical libraries when reviewed. Members, however, are urged to write reviews of any or every recent book which may be of interest to physicians.

TUMORS OF THE HANDS AND FEET. George T. Pack, B.S., M.D., F.A.C.S., Asst. Clinical Professor of Surgery, Yale University School of Medicine, and Cornell University College of Medicine; attending surgeon Memorial Hospital for Cancer and allied diseases. 138 pages. Illus. Price, \$3.00, cloth. St. Louis: C. V. Mosby Co., 1939.

ELECTROCARDIOGRAPHIC PATTERNS. Their diagnostic and Clinical Significance. Arlie R. Barnes, M.D., Mayo Clinic, Rochester, Minnesota. 197 pages. Illus. Price, \$5.00, cloth. Springfield, Ill.: Charles C. Thomas, 1939.

A MANUAL FOR DIABETIC PATIENTS. W. D. Sansum, M.D., Chief of Staff, Sansum Clinic, Director Metabolic Research Santa Barbara Cottage Hospital; Alfred E. Koehler, Ph.D., M.D., Member of Staff Sansum Clinic and Member of Metabolic Research Staff of the Santa Barbara Cottage Hospital, and Ruth Bowden, B.S., Dietitian of the Sansum Clinic, Santa Barbara, California. 227 pages. Illus. Price, \$3.25, cloth. New York: The MacMillan Co., 1939.

THE 1939 YEAR BOOK OF GENERAL MEDICINE. Edited by George F. Dick, et al. 848 pages. Illus. Price, \$3.00, cloth. Chicago: Year Book Publishers, 1939.

PROCTOSCOPIC EXAMINATION AND DIAGNOSIS AND TREATMENT OF DIARRHEAS. M. H. Streicher, M.S., M.D. Assistant Professor of Medicine, University of Illinois College of Medicine, Research and Education Hospital, and Department of Surgery, Grant Hospital of Chicago. 149 pages. Illus. Price, \$3.00, cloth. Springfield, Illinois: Charles C. Thomas, 1939.

PRACTICE OF ALLERGY. Warren T. Vaughan, M.D., Richmond, Va. 1082 pages. Illus. Price, \$11.50. St. Louis: C. V. Mosby Co., 1939.

A new book by Warren Vaughan is certain to be of interest to allergists as the author is one of the sound thinkers in the field. The Practice of Allergy published in the spring of 1939 promises to be a classic and will appeal as strongly to the general practitioner interested in allergy as to the specialist.

The volume is full of the author's own clinical ideas, most of which are eminently sound and practical. The book has personality of its own which makes for interesting reading. Its somewhat intimate flavor does not in any way detract from the careful evaluation of the experimental data upon which the study of allergic phenomena rest.

The historical background is well presented in a section dealing with "The Development of Our Present Understanding of Clinical Allergy." Other sections deal with the general characteristics of allergy, the physiology of allergy, allergic diagnosis, food allergy, inhalant allergy, bacteria and fungi.

Finally, about ninety pages are devoted to consider-

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BOOK REVIEWS

ation of the allergic diseases, including a critical evaluation of the status of allergy in such entities as acne, hypertension and epilepsy.

The arrangement is refreshing but inclusive. The book will well reward those readers seeking either detailed factual data or a general survey of the knowledge of allergy.

ASHER A. WHITE, M.D.

OFFICE GYNECOLOGY. J. P. Greenhill, B.S., M.D., F.A.C.S., Prof. of Obstetrics and Gynecology, Loyola University Medical School. Illus. Price \$3.00. Chicago: The Year Book Publishers, 1939. 406 pages.

This volume is limited to the office procedures in the practice of gynecology, and is the outgrowth of the author's experiences in teaching at the Cook County Graduate School of Medicine in Chicago.

The author states that the book is intended primarily for general practitioners, but it will also be found to be of equal value to the specialist. The book describes the diagnosis and treatment of the various common gynecologic conditions in a concise and practical manner, no space is wasted in referring to the literature or to controversial matters.

The newer developments are briefly covered, such as Hysterosalpingography, Pneumoperitoneum, Artificial Insemination, Contraception, Schiller's Test, Colposcopic Examinations, et cetera. A simplified Aschheim-Zondek test is described using white mice, which can be easily done in the physician's office where larger laboratories are not available.

The chapter on Endocrinology is particularly practical and easy to understand and is still reasonably complete. There is a chapter on the diagnosis and treatment of the more common ano-rectal diseases which will be of value. The last chapter deals with pre-marital examination and advice. This is one of the most valuable chapters in the book and one that is neglected in most textbooks. Altogether, the book is one of the best of its kind that has ever come to the attention of the reviewer and should be on the desk of every practitioner of gynecology.

JAMES R. MANLEY, M.D.

THE VITAMINS. A Symposium Arranged Under the Auspices of the Council on Pharmacy and Chemistry and the Council on Foods of the American Medical Association. Imitation leather. Price, \$1.50 postpaid. pp. 637. Chicago: American Medical Association, 1939.

So much information has become available about the vitamins, that it is difficult even for experts to keep up with the literature. The present volume is a welcome compendium of authoritative information about these accessory food factors. There are discussions of the chemistry, physiology, pathology, pharmacology and therapeutics, methods of assay, food sources and human requirements of each of the important vitamins. The volume is composed of thirty-one chapters written by experts, and is published under the auspices of the

Council on Pharmacy and Chemistry and the Council on Foods of the American Medical Association.

This book should prove to be an indispensable volume for the library of every physician.

MEDICAL STATE BOARD EXAMINATIONS: TOPICAL SUMMARIES AND ANSWERS: AN ORGANIZED REVIEW OF ACTUAL QUESTIONS GIVEN IN MEDICAL LICENSING EXAMINATIONS THROUGHOUT THE UNITED STATES. By Harold Rypins, A.B., M.D., F.A.C.P. Secretary, New York State Board of Medical Examiners; Member, National Board of Medical Examiners, Commission on Graduate Education, Advisory Board for Medical Specialties, Advisory Council on Medical Education; Assistant Professor of Medicine, Albany Medical College; Formerly President, Federation of State Boards of Medical Examiners of the United States; Former Instructor in Medicine, University of Minnesota. Fourth Edition, Revised. Cloth. Price \$4.50. pp. 448. Philadelphia, Montreal and London: J. B. Lippincott Company, 1939.

The untimely death of the author of this book shortly after the publication of this edition, brought to a close a life of great usefulness in the fields of internal medicine and medical licensure. Well known in Minnesota through his former teaching connection here, he had spent the last fifteen years of his life in New York State in the active work of licensure and the present volume represents a summary of his experiences therein.

It is far more than a mere "quiz compend" of the older type. It is in reality a very compact and readable synopsis of the accepted facts in the whole realm of medicine and surgery, a volume which could be read profitably by anyone desiring to secure a condensed review of modern ideas in every phase of our work, regardless of whether or not he is contemplating taking an examination for licensure.

Of course, it is intended primarily for the guidance of those preparing themselves for such an examination and for them the author has a most timely and useful outline of advice in Chapter 1, entitled "Personal Foreword to the Candidate." He strongly adjures the prospective applicant to avoid the common practice of considering such an examination as an ordeal to be dreaded, as if the whole purpose of the test were to set to naught all the candidate's years of preparation and try by every trick and scheme to defeat his effort to secure the legal right to practice his profession. The author emphasizes the fact that most candidates tend to overdo their final preparations up to the very last minute, and come into the examination rooms mentally and physically exhausted. He urges a much more common-sense view of the situation and makes his meaning very plain in the four pages of this initial chapter. His ideas are so sound and helpful in this regard that we feel impelled to suggest that every candidate read them and follow the advice offered.

GILBERT COTTAM.

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Minneapolis, Minnesota
Tel. MAin 4672

SUPERINTENDENT
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